

**EXPLORING HOW LOCATION AND GENDER INFLUENCE THE
PERFORMANCE OF STUDENTS IN PHYSICS**

**(A CASE STUDY OF AKURE SOUTH LOCAL GOVERNMENT AREA,
ONDO STATE NIGERIA)**

**MASTER OF EDUCATION WITH SPECIALIZATION IN NATURAL
SCIENCES**

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Declaration

I Oluseye Folasayo Sadare, declare that, '***exploring how location and gender influence the performance of students in physics***' is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



Oluseye Folasayo Sadare

June 2018

Date

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ABSTRACT

This study explored how location and gender influence the performance of students in Physics in Akure South Local Government, Ondo State, Nigeria. The sample consisted of four schools randomly selected from the co-educational schools in the public schools. Data were collected through interviews, classroom observation, focus group interviews of the students and documents obtained from the school principals on students' academic performance in the West African Senior Secondary Certificate Examination (WASSCE) from 2011-2015. The validity and the reliability of all these instruments were established. The data obtained through interviews were interpreted qualitatively. The documents obtained from the selected schools were also analyzed. The results of the study revealed that the urban students perform better in Physics than the rural students. The study also revealed that the gender of the students affects their performance in Physics with male students performing better than female students. Frantic efforts should be made to ensure conducive learning environment and equivalent learning opportunities to both male and female students.

OPSOMMING

Hierdie studie ondersoek hoe plek en geslag die prestasie van studente in Fisika in die Akure Suid-plaaslike regering, Ondo-staat, Nigerië, beïnvloed. Die steekproef het bestaan uit vier skole wat lukraak gekies is uit die mede-opvoedkundige skole in die openbare skole. Data is ingesamel deur onderhoude, klaskamerwaarnemings, fokusgroeponderhoude van die studente en dokumente wat van die skoolhoofde verkry is oor studente se akademiese prestasie in die Wes-Afrikaanse Senior Sekondêre Sertifikaat-eksamen (WASSCE) vanaf 2011-2015. Die geldigheid en betroubaarheid van al hierdie instrumente is vasgestel. Die data wat deur onderhoude verkry is, is kwalitatief geïnterpreteer. Die dokumente wat van die geselekteerde skole verkry is, is ook ontleed. Die resultate van die studie het getoon dat die stedelike studente beter in Fisika verrig as die landelike studente. Die studie het ook onthul dat die geslag van die studente hul prestasie in Fisika beïnvloed, met manlike studente wat beter presteer as vroulike studente.

Vreemde pogings moet aangewend word om bevorderlike leeromgewing en gelykwaardige leergeleenthede vir beide manlike en vroulike studente te verseker.

UKUQALA

Lolu cwaningo luhlolisise ukuthi indawo kanye nobulili bathonya kanjani ukusebenza kwabafundi e-Physics e-Akure South Local Government, e-Ono State, eNigeria. Isampula lalinabashumayeli izikole ezine ngezikhathi ezikhethiwe kusukela izikole co-ezemfundo ezikoleni zikahulumeni. Idatha abangu eziqoqiwe ngokusebenzisa izingxoxo, ekilasini observation, izingxoxo somnqopho sokufundisa isiqhema lwabafundi futhi imibhalo etholakala othishanhloko esikoleni ekusebenzeni abafundi 'academic eNtshonalanga Afrika Senior Secondary Certificate Examination (WASSCE) kusuka 2011 kuya ku-2015. De geldigheid en de betrouwbaarheid van alle deze instrumenten efen-widegesteld. Imibuzo yezintambo ze-data verkregen yesikhala esiphezulu se-geïnterpreteerd. De dokumenter fra de udvalgte skoler blev også analysisret. Imiphumela cwaningo lwembula ukuthi abafundi ezisemadolobheni basebente kancono Physics ngaphandle abafundi basezindaweni zasemakhaya. Lolu cwaningo lwembula nokuthi ubulili abafundi lthinta hun ukusebenza Physics ne abafundi besilisa kokwenza Ukuze ungcono abafundi besilisa nabesifazane. Imizamo eqondile kufanele kwenziwe ukuze kuqinisekiswa imvelo yokufunda kanye namathuba okufunda okulinganayo kokubili abafundi besilisa nabesifazane.

GLOSSARY OF ACRONYMS

WASSCE	West African Senior Secondary Certificate Examination
NECO	National Examination Council
JME	Joint Matriculation Examination
NERDC	Nigeria Education Research and Development Council
WAEC	West African Examination Council
LGA	Local Government Area
SSCE	Senior School Certificate Examination
FRN	Federal Republic of Nigeria
NPE	National Policy on Education
GRA	Government Reserve Area

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CHAPTER ONE

INTRODUCTION

1. Introduction

This is the introductory part of the study, which gives details of the background and problem statement of the work. The research questions, aim and objectives of the research are outlined.

1.1. Background

Physical science has been considered as the basis on which modern day technological development is built. Recently, many countries throughout the world, especially a developing country like Nigeria are struggling hard to develop scientifically and technologically, as the world and every life functioning is going scientific (Eze, 2014). Science comprises the basic disciplines such as Mathematics, Chemistry, Physics, and Biology. Many investigations have shown that secondary school students are exhibiting diminishing interest in science (Oladejo, Olosunde, Ojebisi & Isola; 2011). Furthermore, according to the Nigeria Education Research and Development Council (NERDC), Physics remains one of the most difficult science subjects and one of the most difficult subjects in the school curriculum (Godwin, 2015). Investigations have shown that the performance of students in ordinary level Physics in Nigeria has not been encouraging for the past few years. It is evident that the study of Physics cannot be effectively carried out without an empirical analysis of some of the factors that do hinder the study of the subject.

According to Akinyele (2011), the academic achievement of students in secondary schools has been a subject of concern to many people including parents, administrators, educators, psychologists, counselors and majorly those in the main stream of science education in Nigeria (Akinyele, 2011). In addition, students' poor performance in Physics in western part of Nigeria has been ascribed to unqualified and inexperienced teachers, poor teaching methods, poor learning

environment, students' poor attitude toward Physics, and gender effect (Akinbobola, 2009).

Eryilmaz (2004) observed that gender contributes to poor achievement of students in Physics. Gender, according to Yang (2010) refers to the social attributes and opportunities associated with being male and female and the relationships between women and men, girls and boys, as well as the relations between women and those between men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes. According to Mbajiorgu (2003), female enrolment in Physics and science subjects in general is very poor. This is in line with the study by Gonzuk and Chargok (2001) which discovered that the number of females who study Physics in secondary and tertiary institutions is small compared to the number of boys. This difference in the number of females and males in the study of Physics has produced gender disparity in the academic achievement of students in Physics and science subjects as a whole

Gender difference was first examined by sociologist of education. The focus was largely on female under achievement at every level of the educational system. Therefore there is need to encourage the teaching and learning of Physics in schools particularly among female student. This is to increase the number of female students that study Physics in senior secondary schools, as well to discourage gender disparity in our society. Ajejalami (1990) recognized the following factors as contributing to under representation of females in science and technology education in Nigeria;

- Lack of functional guidance and counseling services
- Relationship of sex to occupational prestige
- Influence of schooling
- Family background
- Interest among other factors
- Lack of adequate orientation programme
- Societal discrimination against females in education

- Occupational choice and adaptation of science and technology

The critical belief of biological theorists is that gender differences are natural and therefore unalterable (Olubunmi, 2001). It would be right and proper to treat boys and girls in schools differently because their natural inclinations are different roles. Thus, theories were advanced that females excelled in language based subject because of their greater and reasoning abilities yet under performed in sciences because of their lower level of intrinsic ability of shape and form factors (Ogunjuyigbe, Ojofeitimi, & Akinlo, 2006). Studies conducted in the last few years have revealed that girls and boys have diverse interests and approaches toward studying science and different opinions of scientists and science professions (Jones, Howe, & Rua, 1999). Recently, there is a gender consequence that is connected with the expectations of teachers toward females and males in science classes, when students' expectations, social and academic performance are rated by sex rather than being based on his or her individual ability (Lesley & Leonie, 1993). This affects females' attitude towards studying science and they lose their self-confidence in carrying out scientific experiments (Lesley & Leonie, 1993).

Where a school is located says a lot about the achievement of students (Ma & Wilkins, 2002). According to Ezeudu (2003), school location means urban-rural setting. The urban-rural influence is also expected in Physics just like any other science subject because of the psychosocial pressure it may have on the teachers and students resulting mainly from school location. This may even state their academic achievement in science of which Physics forms a part. Therefore, the area in which a school is located can influence the educational achievement of a student. A school in the heart of the government reserved area (G.R.A) or housing estate cannot be compared with a school located in an unsuitable place like motor garage, main street, noisy environment, and nearness to a big market among others (Ma & Wilkins, 2002). Noisy environment is capable of hampering teaching and learning conditions. Long journey to school

can also be drudgery (Ezeudu, 2003). Males and females are under privileged in the rural area where culturally females are expected to marry early and start bearing children and the males are expected to do farm work, fetch water and collect/cut firewood which have affected their performance and enrollment in school (Egun & Tibi, 2010).

Although, studies have been carried out to address the issue of this gender differences, there are still partial investigations on effect of location of schools on the genders. In this study, the interests and experiences of secondary school students in physics subject, both in rural and urban areas will be examined, as well as implications of differences in gender.

1.2. Problem Statement

The major barrier to the progress of education in Ondo State, Nigeria is incessant poor academic performance of students' in Senior School Certificate Examination (SSCE), National Examinations Council (NECO) and Joint Matriculation Examination (JME). Adebule (2004) submitted that there is a consensus about the fallen standard of education in Nigeria. He further affirmed that parents and government are in total accord that their huge investment on education is not yielding the preferred dividend. Teachers also criticize students' low performance at both internal and external examinations (Asikhia, 2010).

There are many research works on gender differences, students' motivation, attitudes and experiences towards science education. However, little literatures have been found on the investigation of the nature of location and gender on the performance of students in Physics. Therefore, this proposed research aims at studying the nature of location and gender on the academic performance of students in Physics, a case study of Akure South Local Government Area of Ondo state, Nigeria. Furthermore, the study seeks to examine which gender performs better in Physics on these conditions, male or female student in urban (developed)

areas and find out which gender perform better in Physics on these conditions, male or female student in rural (less developed) area.

1.3. Research Aim and objectives

The study aim is to reveal the influence of location and gender on senior secondary school students' performance in Physics in the Western part of Nigeria. Other objectives are:

- Examine the effects of location on the level of Physics performance of the students
- Investigating the nature of gender on the students' performance on Physics

1.4. Research Questions

- What is the nature of the influence of location on the performance of physics students?
- How do girls and boys perform in physics?

1.5. Significance of the Study

The study will play a remarkable role in bringing out the effects of the environment on human learning. Educational administrators will benefit from this study as the findings may inform and enlighten them on how to make it conducive for effective learning of Physics by students. This study will help the teachers, particularly those in Physics, to understand their students better. Teachers will be able to handle the situation whereby the students perform below expectation in Physics. It will also enlighten parents and teachers on gender implications on the learning of Physics.

1.6. Delimitation and Limitation

This research work was limited to four senior co-educational public secondary schools, two schools from urban areas and rural areas respectively in Akure South Local Government of Ondo State, Nigeria. This class of students chose to determine their ability in Physics and to

depict academic performance based on gender and location. Owing to the problem of transportation because of poor road infrastructure to the rural community schools, this research work was limited to these few schools.

1.7. Organization of the Study

The organization of the study is as follows:

Chapter one (Introduction)

This is the introductory part of the work, which gives details of the background problem statement to the work, research questions, aim and objectives of the research and contribution of the research to knowledge.

Chapter two (Literature review)

This section of the 'write up' gives the available information relating to the studies being carried out.

Chapter three (Research design and methodology)

Research design:

Under this section, data collected through interviews, observations, documents as a qualitative method of research design are reported.

Methodology:

Here, the research instruments, validity of research instrument, data procedure used during the course of this study are stated.

Chapter four (Research findings and discussion)

Chapter 4 presents data from the interviews and observations in a tabular format. Data is discussed and findings established using the methodical outline developed from the theoretical and conceptual framework of the study.

Chapter five (Conclusion and recommendation)

Chapter 5 gives the summary of the study and provides the outcomes to the research questions. It also examines the findings, contributions and shortcomings of the study and presents its recommendations.

1.8. Summary

This chapter has described the following: the background to the study, the problem statement, aims and objectives of the project, the research questions and the significance of the study. The chapter has also revealed delimitation and limitation of the study. The structural outline of the thesis has also been integrated. The next chapter focuses on the literature review, theoretical and conceptual framework underpinning the study.

CHAPTER TWO

LITERATURE REVIEW

2. Review of Related Literature

This section of the 'write up' gives the available information relating to the studies carried out. It focuses on the senior secondary curriculum of science subject (Physics) in Nigeria. Generally, performance of senior secondary school students in Physics has been affected by gender and school location. The conceptual framework of this study is also discussed under this chapter.

2.1. Physics Education in Nigeria

2.1.1. Structure of Educational System in Nigeria

Education being a tool of modification in Nigeria education policy has been a product of change through chains of chronological developments. In Nigeria, education is used as a vehicle in achieving national development. This is in the view to formulate education policy. (Amagionyeodiwe & Osinubi, 2006). Earlier before 1985, the structure of Nigeria education system was in such a way that 6 years will be spent in primary schools, 5 to 7 years in secondary schools or teacher training college and 4 to 6 years of tertiary education, which may include college of education, polytechnics, college of technology or university education (Ajayi, 2010). In 1985, a system called 6-3-3-4 was introduced into the Nigeria educational system. The structure that emanated can be categorized thus; pre-primary or kindergarten education (2 to 3 years), 6 years of primary education. The 6 years of post-primary education is divided into two half; 3 years of junior secondary school and 3 years of senior secondary school and 4 to 6 years of tertiary education level (Amagionyeodiwe & Osinubi, 2006). The structure of educational system in Nigeria is schematically illustrated in Figure 2.1 (Federal Republic of Nigeria (FRN), 1980)

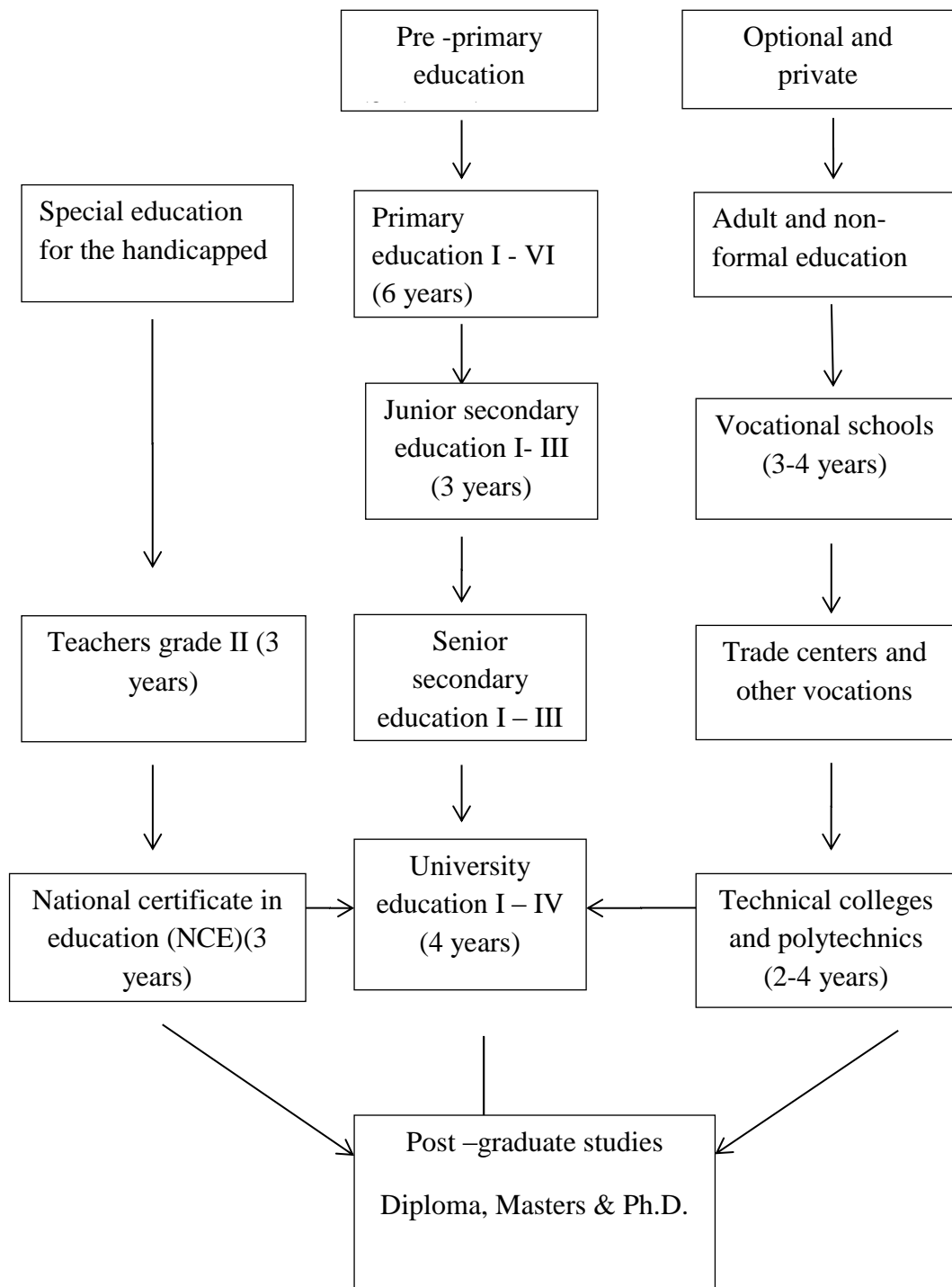


Figure 2.1 Schematic structure of Nigeria educational system (National Policy of Education, 1980)

Educational systems worldwide place serious emphasis on science and technology owing of their effects on technological progression, which is tied to national growth. This aspiration is the case with all developing

nations including Nigeria (Augustine & Adeoye, 2011). In this case, the content of science education curriculum stands as a life wire through which learners in schools are taught to attain goals in technological advancement. Consequently, there is need to review the content of science education curriculum with the inclinations of measures in our changing world and the essential needs of the learners (Ajayi, 2010).

2.1.2. Curriculum of Physics Education in Nigeria

Curriculum is a document, which defines clearly the activities, skills, knowledge and instructional materials as well as probable learning outcomes in a subject. However, textbooks are actual instructional materials necessary for implementation of curriculum. Curriculum has been a wonderful guide for training individuals for effective adaptation in the environment one finds himself or herself (Augustine & Adeoye, 2011). Considering Ifeanyieze (2007), curriculum is a collection of knowledge for the purpose of communicating them to the younger generation. The objectives of the physics curriculum according to Okafor & Nwakwo, (2014) are to:

- Enhance and stimulate creativity
- Provide elementary knowledge for practical living in the society
- Acquire important scientific skills for scientific application of physics and
- Acquire elementary ideas and principles of physics as a preparation for further studies.

Nigerian senior secondary school Physics curriculum consists of following topics; Particle nature of matter, waveform-mathematical and graphical representation, light, waves, electricity, molecular theory of matter, energy quantization, model of the atom-Thompson, Rutherford, Borh, electron cloud model and Limitation of various models (Augustine & Adeoye, 2011).

Examination in educational system of Ondo state, Nigeria is a measure of quality and is designed to assess performance at the end of a course of study (Federal Republic of Nigeria, 1998).

It can be internal or external examination. The teachers within the school system conduct internal examination while external examination is set and conducted by a group of examining bodies. Example of an external examination is senior or junior secondary certificate examinations (Salami, 2002 & Adeyemi, 2008). In Nigeria examinations, the pattern of grading candidates' scores until date is such that A1 to B3 represent distinction grade. C4 to C6 denote the credit grade. The ordinary pass grades are denoted by D7 and E8 while F9 represents the failure grade (Adeyemi, 2008). However, a candidate can only be admitted into Nigerian universities with distinction and credit grades. This is set as a prerequisite qualification for admission with at least credit in five subjects including Mathematics and English language (Jamb, 2002 & Adeyemi, 2008). The statistic of performance of Ondo state students in WAEC examination by science subjects in 2006 as graded in alphabets is shown in Figure 2.2 (Digest of education statistics, 2009)

Table 2.1 Statistic of performance of Ondo state students in WAEC examination by science subjects, 2006 is shown in Figure 2.2 (Digest of education statistics, 2009).

Subject	Performance per subject					
	A1- C6%		D7-E8%		A1-E8	
	2006	%	2006	%	2006	%
Mathematics	9276	36	11642	37	20918	67
Biology	11393	67	9350	37	20743	30
Chemistry	1608	14	3523	43	5131	20
Physics	6101	55	3199	82	9600	27

2.2. Academic Performance of Students in Physics

Recently, many countries throughout the universe, especially a developing country like Nigeria, are struggling hard to develop scientifically and technologically, as the world and every life, functioning is going scientific (Eze 2014). Science comprises the basic disciplines such as Mathematics, Chemistry, Physics, and Biology. Physics is one of the major science subjects at the senior secondary school level (Khan 2016). However, it has recently been discovered that secondary school students are exhibiting diminishing interest in science (Trost, Kleickman & Schubert, (2016). The academic performance of students has been of concern to parents, students and the wider society. According to the Nigeria Education Research and Development Council (NERDC), Physics remains one of the most difficult science subjects and one of the most difficult subjects in the school curriculum (Erimoso, 2013).

Furthermore, investigations have shown that the performance of students in ordinary level Physics in Nigeria has not been encouraging for the past few years (Ogunmogun, 2014). Yusuf & Adigun (2010) stated that many parents believed that academic performance in urban schools is very poor compared with their achievement in rural schools. They also stated that many parents look at the sex of schools before enrolling their wards, with most parents preferring single sex schools to co-educational or mixed sex schools. It is evident that the study of Physics cannot be effectively carried out without an empirical analysis of some of the factors that do hinder the study of the subject. Therefore, this study aims to look into some factors that may be responsible for students' poor academic performance in Physics in the western part of Nigeria as a case study.

Students' performance in Physics at senior secondary school is not encouraging (Godwin, 2015). The poor academic performance of students has generally been blamed on various quarters, which include the teachers, parents, the society, the school, the curriculum, the quality of government policies, planning and execution of education programme and the students themselves (Ezeudu, 2003).

Research findings have inclined to suggest that both intellectual and non-intellectual variables contribute immensely to the poor academic performance of students, poor hearing or poor motivation but because they have learned to consider themselves as unable or inadequate (Parker & Rennie, 1993). The capacity of all forms of traditional examination system covers all aspect of students' cognitive, affective and psychomotor characteristics were highly limited. The system of continuous assessment also provides the teachers opportunity to assess their own instructional techniques on a usual basis in order to facilitate improved teachers' performance (Cote & Levine, 2000).

In any school system, academic performance is the main concern to students as well as the teachers. Studies have shown that factors such as motivation and study time have imparted on students' achievement (Cote & Levine, 2000). Logunmakin (2002) and Gbore (2006) agreed that study time attitude affects strongly the academic performance of students. Adeyemo (2005) opined that study time attitude is an exercise that goes beyond merely reading for pleasure. Study time problems have to do with students' engagement in homework, assignments, reading and note taking, study period, procedure, students' concentration in examination and teachers consultancy services.

Over the years, the overall performance of Physics in secondary school has been generally poor. This has been a lot of concern to the teachers, to many distinguished scholars and personalities within and outside the Akure South Local Government. The student perception of the factors contributing to their performance in Physics with particular focus on the school, the teacher and teaching style, the students themselves and their insight of these subjects deserve the parents and the teachers consideration. However, this study focuses on location and gender effect on academic performance of student in the above-mentioned area of Nigeria senior secondary school in Physics subject.

2.2.1 School Location

School location has been viewed as one factor that affects students' academic achievement (Orlu, 2013). Over the past decades, research has indicated that the educational aspirations of students who study in rural areas lag behind those of their urban counterparts (Byun, Irvin & Meece, 2015). Related findings from other studies have further indicated that students from rural schools place less value on academics (Stem, 1994). Where a school is located says a lot about the achievement of students/.According to Orji (2013), school location means urban-rural setting. The urban-rural influence is also expected in Physics just like any other science subjects because of the psychosocial influence it may have on the teachers and students resulting mainly from school location.

This may even dictate their academic achievement in science of which Physics forms a part. Therefore, the areas in which a school is located can affect the educational attainment of a student. A school in the heart of the government reserve area (GRA) or housing estate cannot be compared with a school located in an inappropriate place like major garage, main Street, noisy location, and nearness to a big market among others (Ezeudu, 2003). Noisy environment is capable of hampering teaching and learning conditions. Long journey to school can be hard work. These variables have the possibilities to influence the students' conceptual understanding (Ma & Wilkins, 2002).

The location of a school determines the academic achievement of the students (Orlu 2013). Consequently, Adebule and Aborisade (2013) in their studies on the influence of study interest and school location on the attitude of secondary school students towards Mathematics in Ekiti State, Nigeria that students that resided in urban centre especially where there are higher institutions like polytechnics or universities are likely to have inclination for higher education than those in the rural setting. They further claimed that students in urban setting could have more access to libraries, laboratories, etc. than those in rural setting.

Owoeye and Yara (2011) in their studies on school location and academic achievement of secondary school in Ekiti state, Nigeria contended that the various review of literature on school location influence on academic performance is not the same. While some maintain that urban students perform better in examinations than their rural counterparts, others establish that rural students perform better. Some have submitted in their findings and concluded that no particular set up (urban or rural) can claim superiority over the other because their performances are the same. Alokun (2010) in his studies on the influence of sex and location on relationship between student problem and academic performance affirms that sex and location do not affect the negative relationship between student problems and academic performance.

Usaini, Abubakar, & Bichi (2015) contend that school location and school size influences students' performance in sciences (Physics in particular). Asikhia (2010) reported that the entire unattractive physical structure of the school building could de-motivate learners to achieve academically. This is referring to learner's environment mismatch. In the same way, Ogunkoya & Fatoyinbo, (2009) also found statistically significant differences in students' science achievement in favor of urban schools as compared to rural schools. The reasons for this may be varied and complex but is probably related to differential access to resources required for quality teaching and learning (Babalola & David, 2011). Baker & Maclyntyre (2003), Kissau (2006) and Bosede (2010) opined that sex and location of school influence students' academic achievement in some subject areas. The results of these studies differ with some favoring males and urban locations and others favoring females and rural locations.

On the effects of location on students' achievement, Kissau (2006) reported that students in urban and rural locations performed in a similar manner, they have superiority over the other because their performances are the same. Alokun (2010) in his studies on the influence of sex and location on relationship between student problem and academic performance affirms that sex and location do not affect the negative

relationship between student problems and academic performance. In another development, Considine & Zappola (2002) studied students' performance and found out that geographical location does not significantly predict outcomes in school performance. Conversely, Usaini et al (2015) asserts that school location has been viewed as one of the factors that affect students' academic achievement.

Location of schools could also be a factor that affects the performance of students in science subjects. Ezendu (2003) in his study on: "classroom environment as correlate of students' cognitive achievement in senior secondary school geography" stated that schools' location means urban and rural schools. Similarly, Quirk (2008) asserts that location is a particular place in relation to other areas. Ezike (2001) reported that urban areas are those with high population density, high variety and beauty while rural areas are those with low population, subsistence mode of life, tedious and burden. Similarly, Usaini et al (2015) indicated that schools in urban areas have electricity, water supply, more teachers, more learning facilities and infrastructure.

Moreover, Shield & Dockrell (2008) while looking at the effects of classroom and environmental noise on children's academic performance found out that both constant and acute exposure to environmental and classroom noise have a detrimental effect upon children's learning and performance. Rural schools are disproportionately likely to have an inadequate pool of teachers qualified in Physics and insufficient funds to maintain up-to-date computers, instructional software, and laboratory facilities Williams (2014). In addition, Owoeye (2002) & Onah (2011) in their separate studies indicated that schools in urban areas achieved more than schools in the rural areas in science subjects. Specifically, Owoeye (2002) observed in his study that schools in urban locations had better academic achievement than their rural counterpart in Chemistry. Similarly, Bosede (2010) stated that gender and location of school influences students' academic achievement in some areas.

2.2.2 Gender

Gender, the characteristics, whether biological or socially influenced, by which people defines male or female (Myers, 2002). He reported gender schema theory as the organized networks of knowledge about what it means to be males or females. According to this theory, children and adolescents use gender as an organizing theme to categorize and grasp their perceptions about the world. This theory is disposed by society's belief about the trait of females and males, and influences processing of social information and social, (Myers, 2002).

Gender is a cultural construct that distinguishes the roles, behavior, mental and emotional characteristics between females and males development by a society. Umoh (2003) defines gender as a psychological term used in describing behaviors and attributes expected of individuals on the basis of being born as either male or female. According to Okeke (2008), the study of gender is not just mere recognition of males and females sex. Scholars have gone further to discover responsibilities assigned in opposite sexes to analyses the conditions under which those responsibilities are assigned. Furthermore, Okeke (2008) exclusively noted that the study of gender means the analysis of the relationship of men and women including the division of labor, access to resources and other factors, which are determined by society as opposed to being determined by sex. It further involves the study of the socio-cultural environment under which responsibilities are assigned and the relationships emanating from it.

This gender equally projects the properties that distinguish and categorize organisms based on their reproductive and cultural expectant roles. It relates to the cultural and psychological attributes of men and women through their socio-economic contributions, expectation and limitations (Okeke, 2008). Thus, the concept of gender does not support or suggest the supremacy of male over female or vice versa in academics and other human resource development areas but it stresses equality and equity in

enhancing effective and efficient recognition, development and utilization of competencies and endowed capabilities of both sexes.

It is obvious that every culture holds male superior to female counterparts and this is evident and confirmed even in our society traditionally, sex role stereotyping and the differential valuation of male and female roles have been viewed as a fundamental part of the socialization process and the development of adult male and female potentials (Umoh, 2003). Males, as naturally endowed, have power and prestige thereby having higher and superior status than women (Umoh, 2003), this illustrates the high level of gender stereotype in education and the society at large.

In most science related fields, there tend to be more males than females (Olagunju, 2001). Shiaki (2005) in his study on attitude of student towards educational statistics found that, the anxiety level of male was marginally lower than that of the female students in educational statistics. Shiaki also found that males scored higher than the females in the confidence learning scale supporting evidence that “males tend to be more confident than females”, this agrees with the study of Clark and Gorski (2002) who found that female students do not perform well in science because of their low level of confidence and not their ability level. In addition, investigation was carried out in other countries with regard to gender effect on academic performance of students in science subjects. Kiiru (2017) in his study on influence of gender on self-concept and academic performance found that, male students perform well in academics compared to the female students. The poor performance of students in science, especially Physics, has continued to be a major concern to all and particularly those in the main stream of science education in Nigeria (Esibu, 2005). Eryilmaz (2004) observed that gender contributes to poor achievement of students in Physics. Gender, according to Yang (2010), refers to the social attributes and opportunities associated with being male and female and the relations between women and men, girls and boys, as well as the relations between women and those between men. These attributes,

opportunities and relationships are socially constructed and are learned through socialization process.

According to Mbajjorgu (2003), female enrolment in Physics and Science subjects in general, is very poor. This is in line with the study of Oliver, & wood-McConney (2017) which revealed that the number of females who study Physics in secondary and tertiary institutions is small compared to the number of males. This difference in the number of females and males in the study of Physics has created gender inequality in Physics and science related subject as a whole (Oliver, & wood-McConney (2017). Sociologist of education first investigated gender difference. The focus was largely on female under achievement at every level of the educational system. Therefore, there is need to promote the teaching and learning of Physics in schools especially among female students. Iwu (2017) recognized the following factors as contributing to under representation of females in science and technology education in Africa:

- Lack of functional guidance and counseling services.
- Relationship of sex to occupational prestige.
- Influence of schooling.
- Family background.
- Interest and other factors.
- Lack of adequate orientation programme.
- Societal discrimination against females in education.
- Occupational choice and adaptation of science and technology.

Nworgu, Ngwanyi & Nworgu (2013) in their contributions suggested that poor enrolment of girls in science subjects (physics) is due to; negative attitude of female students in physics, the mathematical aspect of physics, the unfavorable environment and parents and peer influence. Some of these are inadequate opportunity for girls to study science, inadequate interest of girls in science, unfavorable attitude of girls to science learning and inadequate knowledge of girls on the true nature of science. The critical belief of biological theorists is that gender differences are natural, therefore unalterable (Olubunmi, 2001). It would be right and accurate to

treat boys and girls in school differently because their natural inclinations are different role. Thus, theories were advanced that female excelled in language-based subjects because of their greater and reasoning abilities, yet under performed in sciences because of their lower level of inherent ability of shape and form factors (Olubunmi, 2001). In addition, students' poor performance in Physics in western part of Nigeria has been ascribed to unqualified and inexperienced teachers and poor teaching methods (Akinbobola, 2009).

2.3. The Teacher and Effective Teaching

Teaching is said to be a process that facilitates learning. Teacher has a special role in controlling all the instruction and learning environment in the classroom (Krogh & Thomsen, 2005). The heart of Nigeria's educational system is the teacher, whether at primary, secondary or university level (Aluko, 2002). The teacher is and would continue to be the major determinant of quality education, to further support the importance of teacher in educational matter (Aluko 2002) affirmed, "The teacher is the spark that fixed the whole development process, the key man in the drive for progress".

Murphy & Whitelegg (2006) in a study to identify the strategies that have succeeded in increasing the number of girls studying Physics for the past 16 years in united kingdom, noted that all students require support from teachers but in Physics, where some girls have a less positive self-concept, it is much more imperative for them to receive support. In addition, they found that boys tend to find male teachers more cooperative and understanding than girls find teachers of either sex. Teacher's behaviors and attitudes are key influence on students' attitude, motivation, achievement and containing participation (Labudde 2000). Krogh and Thomas Thomsen (2005) findings discovered that personal teacher's support was a key predictor of attitudes to Physics. Teachers' isolation or uncaring attitude towards male and female students can particularly affect their choices as they move to college. Babalola (2000), describes

teacher's behaviors or efficiency in terms of four apparent behaviors which include: physical movement, voice inflection, eye contact and humor.

Fidden (2004), reported that good study habits help the student in critical reflection in skills outcome such as selecting, analyzing, critiquing and synthesizing. A teacher cannot expect to work well with his students, if the teacher's self-acceptance and self-definition are negative. A teacher who is not at peace with himself or herself as well as with other people cannot be able to converse with students (Fidden, 2004). Mestre, 2001 suggested list of cognitive findings for physics teachers for effective teaching. The suggestions are listed below:

- Students should be given opportunity to apply their knowledge flexibly through the compound contexts
- Opportunity should be opened to students to learn the process of doing science
- Students should be encouraged based on the quantitative reasoning
- In depth understanding of the contexts should be the central focus
- Meta-cognitive strategies should be taught to the students
- Students should be given formative assessment to monitor students' understanding for providing feedback to both students and the teacher.

Based on previous studies, the impact of gender and location has not been stable on students' academic achievements. This calls for continuous verification of the influence of sex and location on students' achievement in science from place to place and from time to time. Hence the current study investigates the nature of location and gender on performance of students in Physics in Ondo State, Nigeria

2.4. Conceptual Framework

The theoretical basis for this study is therefore provided by Maslow's (1954) motivational theory. According to this theory, needs are categorized into two; deficiency needs and growth needs. The theory states that if deficiency needs are satisfied, students' desire to know and

understand would be achieved easily and the students are likely to operate at the growth needs level. However, teachers can inspire their students to meet their growth needs level by improving the learning environment. Consequently, the location where a student is learning can be made attractive and conducive for effective learning (Adesoji & Olatunbosun, 2008).

Figure 2.2 shows the conceptual framework for this study. This model illustrates the well-known factors and the connection these factors have on students' achievement as determined by performance in Physics subject of senior secondary school students.

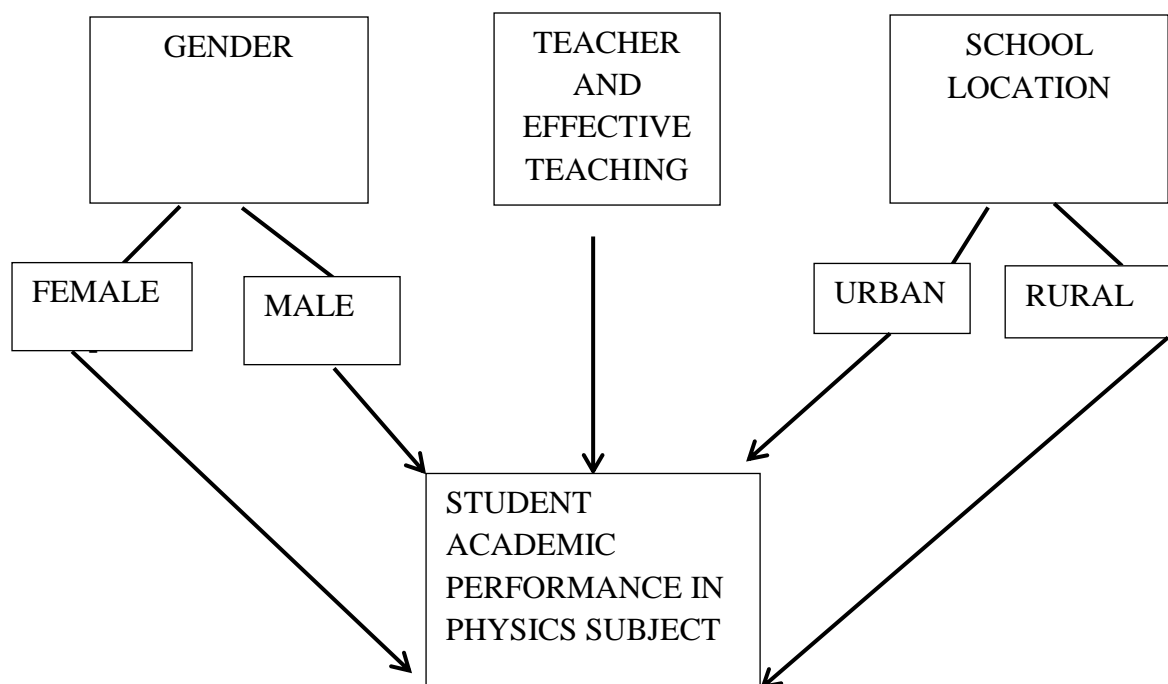


Figure 2.2 Conceptual framework of academic performance of students in physics subject as affected by gender and school location.

2.4.1. Theory of Gender

Gender, by sociologists, was defined as either constructed or attained through a process of socialization, whereby males and females grow into men and women acquiring opposite and distinctive traits based on sexual category (Ingraham, 1994). Furthermore, Hess, Markson, and Stein's

Sociology affirms that gender is made up of femininity and masculinity as features however, maleness and femaleness are attributed traits (Ingraham, 1994). Lamb in his findings said, children seem to use a wide variety of verbal and non-verbal behaviours to influence their peers' gender role development. He added that environment that encourages strict observance to traditional gender roles, such as authorization of stereotypic beliefs and gender isolation, are likely to result into yield dysfunctional consequences. These children suffer negative consequences such as low self-esteem, low social capability and approval (Yunger, Carver, & Perry, 2004 & Lamb, Bigler Liben, & Green, 2009). It is within this framework that the present study looked into the student's performance in Physics subject based on influence of gender and school location.

2.5. Summary

This chapter has reviewed the structure of physics education in Nigeria. It focuses on the senior secondary curriculum of science subject (Physics) in Nigeria. Generally, performance of senior secondary school students in Physics has been affected by gender and school location. The conceptual framework of this study is also discussed under this chapter. The study has revealed the influence of location, gender and effective teaching on the academic performance of students in physic. The theoretical basis for this study is underpinned by Maslow's motivational theory. The literature reviewed provides a basis for the analysis and discussion of the results. In the next chapter, the research design for the study is discussed.

CHAPTER THREE

RESEARCH METHODOLOGY

3. Research Methodology

This section discusses the methodology and design of the study. It involves research approach description, the nature of the research, the framework of the study, as well as the techniques and measures used in data gathering. It also presents statement on the research ethics and the meticulous way in which it ensured rigor. The research approach was qualitative aimed at facilitating the analysis of exploring how location and gender influence on the performance of students in Physics at Akure South Local Government Area of Ondo State, Nigeria.

3.1. Research Design

Research design has to do with putting up of a search purposely to identify the related variables in a research and how these variables relate with one another. This step in a research process is very necessary in order for effective solution to research problems and hypotheses. In addition, research designs is a valuable instrument, which assist in guiding during collection of data and process analysis (Olu, 2005). This generally describes; the set-up of the research, what method will be used for collection of data and the contributions of the participants.

Qualitative research is mainly investigative research (Wyse, 2011). It has to do with a process of uncovering trend in notion and view and dig deeply into the problem and provides thoughts or assumption for probable quantitative research. In addition, it is used to achieve a perceptive of fundamental basis, motivations and views of a research. In order to collect qualitative data, semi-structured or unstructured method may be used (Wyse, 2011). Examples may include interviews with individual teachers, group discussion and observation. This usually involves small sample size and respondents to carry out the set part. Therefore, in this study interviews were conducted with Physics teachers in the selected schools

in the rural and urban areas in order to answer the research questions. Focus group interviews were also conducted for boys and girls in the selected schools. The Physics teachers were also observed while teaching in the classrooms and data were collected during teaching and learning activities. This study comprises of four phases. Stage I entailed development of research instruments. Stages II pointed out the research instruments with a view to process and validate them. Stage III involved collection of data from the sample population. The last phase revealed the analysis of the data.

3.2. Location of the study

Akure South Local Government Area (LGA) of Ondo State, Nigeria is used as the case study for this investigation. It is situated in the Southwestern geopolitical zone of Nigeria. The town is situated in the tropic rainforest zone in Nigeria. It was created on October 1st, 1996 out of Akure LGA. The headquarters is situated in Akure city, which is the capital city of Ondo state. It occupies 318 square kilometers and lies within $6^{\circ}94'$ - $7^{\circ}25'$ and $5^{\circ}05'$ - $5^{\circ}40'E$. The area has a population of 353,211 people as at 2006 population census. Yorubas who are the principal tribe in south-west of Nigeria mainly dominate Akure south local government. The main settlements in the LGA are Akure and Oda while small settlements consist of Igbatoro, Iwoye, Aponmu, and Ipinsa (Emmanuel, 2013).



Figure 3.1 Map of Nigeria showing Ondo State

3.3. Target population

The present study consists of the simple randomly chosen public secondary school students and some Physics teachers in Akure south Local Government Area. Secondary schools that are owned by the state governments are referred to as “public schools” in Nigeria. There are 48 public secondary schools in Akure, state capital of Ondo state. Akure South LGA comprises of 27 public secondary schools. These schools represent about 60% of the total number of schools in the region (see appendix A). The most recent statistic of number of students’ registration in WAEC is a report in 2014 which showed that in Ondo state a total number of 38,797 students registered for WAEC where 20,323 were male and 18,474 were female (WAEC report, 2014). Also, table 3.1 shows Ondo State/ Akure South Public Secondary Schools WASSCE Registration from 2010 to 2015 indicating the number of results released in the state and Akure South Local Government (ODMOE/PR&S/EMIS 08/12/2016)



Figure 3.2 Map of Ondo State showing Akure South local Government Area (LGA)

NUMBER OF RESULTS RELEASED

S/N	YEAR	STATE	AKURE SOUTH
1	2010	22, 964	2, 493
2	2011	27, 071	2, 938
3	2012	24, 481	2, 771
4	2013	27, 243	2, 752
5	2014	27, 703	2, 694
6	2015	27, 207	1,783

TABLE 3.1: Ondo State/ Akure South Public Secondary Schools WASSCE Registration from 2010 to 2015

SOURCE: ODMOE/PR&S/R&S/EMIS 08/12/2016

3.4. Sampling and sampling size

This section described the sample techniques used in the sample selection and the methods of the sample size determination used for this investigation.

3.4.1. Description of Sample

The following are the main basis of information in the study;

- A. SSIII Physics students in the sample randomly selected secondary schools in Akure South Local Government Area. Four public secondary schools were randomly selected from the twenty three (23) mixed schools out of the twenty seven (27) Secondary schools in the Local Government Area. However, twenty one (21) co-educational schools were found in the urban areas while only two (2) schools were in the rural areas. The twenty one (21) mixed schools were written down on pieces of paper, folded and put in a basket thoroughly mixed together. Two papers were then picked without replacement. The two schools in the rural areas were used as sample. SS I and SS II Physics students were not considered for this study because they were not well exposed to Physics syllabus since

the topics covered at those levels would not be much. Some of the students might eventually decide to drop Physics if they were unable to cope with practical and calculations before they got to SSIII. Thus, SSIII class was considered ideal for this study, as the students would have registered for Physics at the West African Senior School Certificate Examination Level. In addition, they would have made up their minds to choose Physics as a subject that would enable them pursue their future career. Registering in the West African examinations was ideal since it was a well acceptable and recognized examination body for West African school certificate students. It is after passing the examination that the students would be free to advance to higher institution of Learning.

- B. Physics teachers at selected secondary schools: Teachers play a major role in educational policies and implementation of curriculum guidelines. Their belief in the gender capability of the student determines the academic performance of such student. This belief is ascertained by Pygmalion effect which states that the expectation of someone about another person can in the long run make that person to behave and act in ways that confirms those expectations. Therefore, teachers' expectations could affect students' academic performance (Spitz, 1999 & Bruns, McFall, McFall, Persinger, & Vostal, 2000). Therefore, they play a major part in the determination of the value of education (Akinsolu, 2011). They were used in the research since they are involved in the implementation of the Physics curriculum. Furthermore, teachers work with different students with different behaviors. The teachers would be chosen based on experience. Teachers' experience remained imperative for this study due to the duration of service as a Physics teacher, exposure to various aspects of teaching Physics and skills needed to modify any gender bias behaviors in the classroom. Based on this study, educated teachers are less likely to disseminate misconception and are more confident in imparting information. Less

time utilized for preparation, and are capable of presenting a broader choice of examples and correspondences with a view to helping students to study and comprehend a specific topic more simply (Akala, 2010); only instances does teaching experience produce greater Physics achievement.

Teachers with teaching experience of zero to five years are looked at as not experienced enough because some studies have shown that the effect of inexperience can be a major hindrance to students' academic performance. Adeyemi (2008) reported in his findings that teachers' teaching experience affects the performance of students in senior certificate examination. He further concluded that students from schools with teachers having five years or more teaching experience, performed better than students from schools with teachers having less than five years teaching experience. Zhang, 2008 also investigated on the effect of hiring experienced teachers to teach science subjects. The result showed that experienced teachers who updated their academic knowledge impacts positively into their students in science subjects compared to experienced teachers who refused to update their knowledge. Those with between six to ten years of teaching Physics were considered adequately experienced while those with more than ten years of teaching were considered very experienced. Teaching experience typically five years or more produces higher students results and perform better as a result of their stronger academic skills (Policy Studies Associates (PSA), 2005)

3.4.2. Sample selection technique

Sampling involves three main activities: problem definition, data collection and generalization. Sampling is undertaken in order to choose from a population a number of elements, which reflect the appropriate features of the population. Research studies are discrete procedures that entail a certain group of people. Sampling is therefore taking part of a data in a procedure from a larger set of data and a deduction is drawn from it. Therefore, in this study Akure South Local Government was chosen out

of many local governments in Ondo state because the headquarters is situated in Akure, which is the capital city of Ondo state. In addition, the main settlements in the Local Government Area (LGA) are Akure and Oda. Other local government areas such as Igbatoro, Iwoye, Aponmu, and Ipinsa are small settlements, which consist of few numbers of students. The category of school that is public secondary schools and the school type (co-educational/ mixed school) where the research was carried out was part of a data that was used as sample. The selected schools were, however, a representative sample of the whole state since they were selected by simple random sampling method.

This section emphasizes the way and manner samples are taken. Different samples employed in this study are described below:

- **District:** Akure South Local Government was selected for the study.
- **School category:** This study was confined to public senior secondary schools (Co-educational/mixed)

C. **School type:** simple random sampling method was chosen to guarantee desire representation. For the purpose of the study, mixed schools were concentrated upon. The teachers were interviewed to ascertain why students in urban areas performed better than students in rural areas in Physics as well as to gather information on why male students performed better than female students in Physics. Teachers were observed in the classrooms during teaching and learning activities. According to studies, the registration of female students in Physics and Science subjects has been found to be generally poor (Nworgu et al., 2013). This is in procession with the investigation of Oliver (2017) which showed that the number of females who study physics in secondary and tertiary institutions is small when compared to their male counterpart. This variation in the number of females and males in the study of Physics created gender variation in Physics and science related subject as a whole. Focus group interviews were also

conducted for the students to know why male students perform better than the female students do.

3.4.3. The sample size

In an empirical study, sample size is an important aspect for consideration. It is an essential statistical concept which refers to the number of individual pieces of data collected in a study. The purpose of sample size is to verify the accuracy and reliability of a research. Under this section, the following processes were used to determine the sample sizes of this study and were explained below:

- A. Number of schools:** Akure south has 27 public secondary schools. Out of this, there were twenty-one (21) co-educational secondary schools in the urban areas while only two schools fall within the rural areas. For this study, four (4) mixed schools were used since only two schools fell within the rural areas of Akure South Local Government Area. Two mixed schools were randomly selected from the urban areas using the simple random sampling technique. The 21 mixed schools were written down on pieces of paper, folded and put in a basket thoroughly mixed together. Two papers were then picked without replacement. This eventually represented the schools chosen from urban areas. The only two schools, which are co-educational in the rural areas, were added to the two schools from the urban areas making four schools chosen for this study.
- B. Number of respondents:** The four physics teachers in the sample had qualified papers to teach Physics at the SSS III level. They had B.Ed. in Physics at university level. The four teachers were interviewed and observed during classroom teachings. Since four schools were selected as sample, the focus group interviews comprised of five male students and five female students randomly selected from each school. Forty students were interviewed in the focus group interview.

3.5. Research instruments

In order to achieve the objectives of the study, a cross-sectional descriptive survey, using correlation methods, was the study design that was used. The survey was selected because it engaged collecting data in order to proffer solutions to questions relating to the current position of the subjects of the study (Gay, 1992). In addition, a cross-sectional study was an observation study, which was used to collect data from the various secondary schools chosen for this study. This was in order to sort out the reality and extent of the effects of the independent variables (Gender and location) upon dependent unpredictable (academic performance) in Physics. The following research instruments were employed for data acquisition:

- Standardized tests of attainment or performance
- Interviews
- Observation

The present study would use the following sets of instruments as data gathering techniques for data collection.

Standardized tests of attainment or performance: The academic records of West African Secondary School Certificate Examination (WASSCE) results from 2011 to 2015 were collected from the principals of the selected schools for the purpose of this study, to ascertain the level of students' academic performance in Physics.

Interviews: Four Physics Teachers were interviewed to obtain data on why students in urban areas perform better than the students in rural areas in Physics. Data was also gathered on why male students perform better than female students in Physics do. Students in the four sampled schools were also interviewed. The focus group interview method was adopted to gather data on why male students perform better than female students in physics. In the focus group interview of individual selected school, five male students and five female students participated in the

interview. Forty students partook in the interview. The interviews of the teachers and the students were used to answer the research questions

Observations: The Physics teachers were observed in the classroom to ascertain their level of involvement in the teaching and learning process. Also to know if the teaching is learner centered in conjunction with the effectiveness of the teachers in classroom teaching, towards enhancing students' academic performance in Physics.

Qualitative research cannot be measured numerically is always expressed in words. It is useful for finding insights into people's thoughts, opinions, and motivations. The qualitative data was collected through the inferences drawn from the respondents.

Qualitative data was collected through interview method. For the purpose of this study, Semi-structured interview was made use of. The interview was meant to gather information on teacher's understanding and instructional methods. The questions relating to teachers understanding was based on the teacher's content and context together with students' understanding about physics. Content questions centered on teachers' understanding to some basic approach in physics. The context knowledge questions solicited for the availability of resources utilized. Questions relating to the teaching methods adopted by the teacher and the reasons for using them were part of the interview conducted by the researcher. Also questions based on how location and gender affected academic performance were asked from the teacher.

The first interview questions included the background of the school for contextual purposes to ascertain confidence in the teacher. Pre-observation interviews were conducted to obtain information with regard to what the teacher carried out in the next lesson. The post observation interviews were carried out to acquire more data from the teacher.

The researcher visited the selected schools in the first week of the interview. A meeting was held with the principal on the first day. The researcher seized the opportunity to inform the principal on how the data

collection process would be carried out. The researcher informed the principal that the research would be conducted in such a way that there would be no disruptions to the normal academic activities of the school. Teachers were asked to prepare copies of timetables, which were collected the following day. The timetables were eventually collected the following day. In the second week, mock interview was conducted for the teachers in the entire nine schools. The mock interview preceded the real interview. The four teachers were interviewed in the third week of the data gathering process.

3.6. Data collection techniques

Data, according to Nwankwo (1984), can be defined as “facts, observations or information in isolation whose meaning and bearing to the subject will depend on their choice, analysis and interpretations”. In other words, data are quantified responses, gathered from various respondents or the observed for the purpose of analysis and interpretation. The concept of data collection is concerned with data gathering. As researchers, our concern with data collection would be studying the where and how of data gathering. Generally, data can be classified into two types; primary data and secondary data. Primary data are data obtained through observation, test administration, questionnaire, data manipulation and details for the intention of conducting a study. After collection, classification, analyses and publication of such data then it becomes secondary data. Examples of secondary data are; textbooks, newspapers, journals, magazines, bulletin etc (Olu, 2005).

In this study, data was collected using academic records of students of the selected schools in certificate examination. This enabled the researcher to get information about the students from the school principal from past examination results. The grade point of students in Physics in West African Senior School Certificate Examination (WASSSCE) from 2010/2011 to 2014/2015 academic sessions constituted the data. The examination certainly revealed the performance, of males and females

students of the selected schools based on their geographical location (Appendix A). After the collection of data, it was then analyzed. The process is referred to as document analysis.

Qualitative analysis would consider the inferences that were drawn from the opinions of the respondents. There was narrative presentation of the analysis and where possible in tabular form. The qualitative data collected through interview method was recorded in audio tape and transcribed exactly into a word document. Errors detected were not corrected so that the actual meaning was not lost. The respondent was requested to reiterate if the translation really depicted what he/she meant in his/her language after the transcription of the file, the document was then, painstakingly, examined. The audio tape was listened to, thereby ensuring that the information in the audio recording was the same as the one in the word document. The interview was then transcribed and coded.

The coded transcripts would eventually be analyzed. Four processes would be involved in the interpretation of the coded transcripts. The first one involves the development and validation of data analysis scheme. The second process involves reading of the transcripts with one theme in mind. The category was coded with track changes and its characteristic recognized. The third process involves the subsection of the coded transcripts to validation of an expert. The fourth process involves writing the coded data in tables to analyze and interpret the data. The researcher ensured statements with which the respondent was asked that the research field was adequately organized by communicating with the participants always as regards aspects pertaining to the research based on confidentiality. The permission to undertake the research in the sampled schools was sought for many months prior to gaining entry. In the process, the essence of the study together with the unit of analysis was also well described. The researcher enhanced internal validity. The researcher ensured that the research field was prepared by informing the participants constantly about aspects relating to the research, such as confidentiality. The permission to conduct the research was sought for

many months in advance. The focus of the study as well as the unit of analysis was also well described. A good rapport was put in place with teachers.

There was description of the context where the study was conducted and researchers positioning. Teachers were not informed about the aspect that consisted part of the data for the study. The Reporting style was done in such a way that the researcher's interpretation of the data was the same. This was achieved by quoting directly what the respondent said during the interview process. The techniques were piloted to ensure their validity. Validity was done by presenting the piloted techniques to the scrutiny of academic supervisors for their comments. They were then refined and administered to a sample related to the one from which data was collected. The researcher decided on how data would be presented before the analysis. The reliability of the coding was really tested. After the pilot test, modification of the research questions was effectively carried out.

3.6.1. Rigor

Rigor in research can also be termed the assessment of trustworthiness of the research. Regardless of the approach taken to carry out an investigation, the worth of the efforts will be assessed by the readers, reviewers and peers. Rigor can also be judged by the reason of the rising assumption and whether the results are corresponding to what is known about the observable fact (Krefting, 1991). The worth of any qualitative research is recognized by assessing the validity and reliability of the work (Payton, 1979).

Rigor in qualitative research is defined by quite the opposite set of criteria and is related with being open to the data; careful adherence to a specific idealistic perspective, and diligence in collecting data. Scientific rigor is a theory which is usually applied to qualitative research owing to their as this kind of investigation is not experimental in nature.

The steps of a qualitative and quantitative study must comply with the fundamental trustworthiness of the investigation. According to Guba's model of trustworthiness, the criteria have been outlined as follow (Guba, 1981):

The true value of the study: This explains the extent to which the researcher will establish confidence in the truth of the findings for the subjects and the context in which the study will be undertaken (Lincoln & Guba, 1985). It establishes how confident the researcher is with the truth of the findings based on the research design, informants, and context. Internal validity is supported when changes in the dependent variable (academic performance) are accounted for by changes in the independent variable (gender and location), that is, when the design minimizes the effects of competing confounding variables by control or randomization. Therefore, for credibility of this study, the researcher focused on testing the performance of senior secondary schools students (male and female) in Physics subject. Various senior secondary schools both in rural and urban settings of Akure South local government area of Ondo state from which the data drawn or the teachers that will be interviewed with the facts under investigation.

Applicability of this study: This explains the extent to which the findings can be applied to other collections, backgrounds or locations. It is the ability to take a broad view from the conclusion or results of a research investigation to larger populations. The proposed findings in this study from Akure South Local government can be applied to the whole of Ondo state, which is a larger population, even to the whole states of the country, Nigeria.

Consistency of this study: This explains the consistency of the results, if question are repeated with the same focus or similar framework. It is the extent to which repeated administration of a measure will give the same data or the extent to which a measure administer on one occasion, but by different people, yield the same results. Therefore, the investigation under study to study the academic performance of senior secondary

school students in Physics subject considering gender and location will be consistent.

Neutrality of this work: This explains the extent to which the results or findings are a function of the subjects/informants and circumstances of the research and not of other motivations, biases and perception.

3.7. Statement on Research Ethics

It is necessary for the researcher to make known his agenda, fundamental and perspective from the beginning. The research work is meant for the fulfillment of the Master of Education degree. The essence of this research is to contribute to the society positively by making known the findings from this research in reputable or international journals and conference proceedings. The major purpose of carrying out this investigation is to improve academic performance of students in Physics regardless of gender and location. Ethics are typically associated with morality and deal with matters of right and wrongs (Charamba 2013). During the course of carrying out this investigation, there were difficulties in getting participants such as students and teachers to cooperate. This is common in research works and the right of the students or the researcher should respect teachers.

The privacy of the participants was taken into consideration and this was where ethical issues arose. These began with what researcher was investigating and the method he used to ensure validity and reliability of the data collected. Individual's data were kept secret. Confidentiality and anonymity were ensured. The researcher ensured that no one else except himself had access to the names, responses and conducts of the participants. The learners had the right to know before participating who would have access to their data. The result obtained from the data should not be traceable to any individual participants through names. Therefore, numbers were allocated to the names of the participants. While reporting the result of the research findings, the researcher used impersonal codes to ensure anonymity. In addition, sincerity in answering the questionnaire

by the participants was necessary and vital to ensure reliability and validity of information. Ethics rights of learner were valued in this study as follow: confidentiality and anonymity, informed consent, voluntary participation, and full disclosure. Permission was requested from the principals of these schools to carry out this research. Hoping with the above techniques to obtain and analyze data for this study, the intention of this study would investigate how location and gender influence the performance of the senior secondary school students in Physics.

3.8. Summary

The study being qualitative was underpinned by the interpretative paradigm as discussed in this chapter. The research context, focusing on the location of the study, target population, and the sampling process. The research instruments such as standardized tests, interviews and observations to collect data were discussed. In conclusion, statements on research ethics were also considered in the study. The next chapter includes a presentation and discussion of the data as well as the findings of the study.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4. INTRODUCTION

This chapter presents, discusses and reports on the findings of this research work. The findings are aimed at answering the following relating questions:

- What is the nature of the influence of location on the performance of physics students?
- How do girls and boys perform in physics?

To answer research question 1, four teachers participated in both the interviews and the observation of classroom teachings. Each case is presented singly to ensure that each teacher's knowledge and practices in teaching are clearly understood fully. The four teachers are referred to as **Mr. John, Ms Jones, Mr. clement and Mr. Patrick**. Data collected from the focus group interviews of the students of the selected schools provide information on How do girls and boys perform in physics? .The records obtained from each school from previous West African Senior Secondary Certificate Examinations (WASSCE) results are also used for document analysis.

4.1. CASE 1 (MR JOHN)

4.1.1. DATA PRESENTATION

In this section, data is presented.

A. LOCATION

Case 1: Case 1 (Mr. John)

The study revealed that Mr. John was an experienced and competent physics teacher in an urban area. His teaching methodology was superb. The introduction of prior knowledge in his teaching made his students to

understand physics very. The teaching of Mr. John was learner centered which was revealed by the interaction between him and his students. Mr. John utilized demonstration and illustrative methods during classroom teaching. These greatly enhanced effective teaching thereby promoting students' better academic performance.

The interview conducted revealed that Mr. John's school, being an urban one, had a multipurpose laboratory that was well equipped. Not only that, his school had a standard, well-equipped library for students to read where they had access to materials that would update their knowledge. Students also had access to internet facilities. When all these facilities are put in place, students understanding and academic performance would be adequately enhanced.

Case 2: This study showed that Ms Jones classroom teaching was well explanatory. Students acquired more knowledge when a teacher explains a particular topic thoroughly. This will go a long way to improve the students' academic performance. The teacher imbibed demonstration and illustrative methods during the classroom teaching. The students paid rapt attention to her because the topic was not taught in abstract. Students comprehend more when they see things than when only explanation is made. Ms Jones contextual knowledge was superb. She made use of relevant resources to demonstrate reflection and even refraction as infused into the lesson to her students.

The aims and objectives of the teaching were well achieved. During the interview, it was reliably gathered that Ms Jones had been teaching Physics for the past twenty-eight years. The years of experience have greatly enabled her to impart knowledge adequately to the students. The classroom teaching reflected her experience in the proper usage of resources in the teaching and learning activities. According to her, the environment being urban had been fair for teaching and learning.

The Students were exposed to Physics practical once there was practical work in the theory to do. The school being an urban school had enough equipment; as a result, students were exposed to practical always.

Case 3:

Mr. Clement ensured that the students settled down before the commencement of the lesson this adversely affected the time allotted for the lesson because part of the time was used in settling the students down. He eventually spent little time in teaching the topic. This should be discouraged because there is no way by which the lesson could be effectively carried out. The teacher often times rush over the lesson without achieving the aims and objectives of the lesson. Mr. clement lesson was not well planned which really hampered the students' understanding of the topic. When the aims and objectives of classroom teaching are not achieved, the cumulative effect is poor academic performance of students.

The teacher's answer to a student's question was full of misconception. Simple explanation would have been used for the student to understand better. This is misconception on the part of the teacher.

During the teaching and learning activities, no resources were observed throughout the lesson. The students were not given any materials to observe. When there is non-availability of resources, the topic becomes abstract to the students and this would not enable them to comprehend easily.

Based on the interview conducted, Mr. Clement mentioned that location could adversely affect students' academic performance, not only in Physics but in other subjects too. The students in the urban areas performed better to those in the rural area, because they have access to internet and purchase of textbooks always. Parents of students in the urban areas are more enlightened and they want the best for their ward. Schools in urban areas also have well equipped libraries for students. The laboratories in urban areas have adequate apparatus for Physics

practical. Location really helps those in urban areas than rural. The adequate facilities in place really pave way for the students to perform better to those in the rural areas

Case 4 (Mr. Patrick)

Mr. Patrick classroom was spacious and very neat except that the ceilings were broken which made the class very hot in the afternoon. The Physics class was not conducive at all. So many students were lumped up in the classroom. During the classroom teaching, it was observed that the class was very hot. The lesson should have done before break time or immediately after break time. This would enable the students to participate well in the class.

Based on the interview conducted, Mr. Patrick had been teaching Physics for the past fifteen (15) years. The school being a why students in urban areas performed better than students in rural areas in Physics and why male students performed better than female students in Physics. Four teachers participated in both the interviews and the observation of classroom teachings. Each case is presented singly to ensure that each teacher's knowledge and practices in teaching are clearly understood fully. This chapter presents data from the four teachers participating in the study. The four teachers are referred to as **Mr. John, Ms Jones, Mr. clement and Mr. Patrick**. Data collected from the focus group interviews of the students of the selected schools provides information on why male students perform better than female students in physics. The records obtained from each school from previous West African Senior Secondary Certificate Examinations (WASSCE) results are also used for document analysis. The relevant segments of data leading to the answering of the research questions are presented, discussed and findings made in this chapter.

4.2. CASE 1(MR JOHN)

4.2.1. DATA PRESENTATION

In this section, data is presented.

B. LOCATION

Table 4.1: reveals the characteristics that showed the performance of students in an urban area. The focus was on the interview conducted.

Researcher: R Respondent: T

THEME	CATEGORY	CHARACTERISTICS
LOCATION	URBAN	<p>R: For how long have you been teaching Physics?</p> <p>T: I have been teaching physics for the past sixteen (16) years</p> <p>R: How conducive is this environment for teaching and learning?</p> <p>T: The environment is well conducive for teaching and learning</p> <p>R: Do you have Physics laboratory</p> <p>T: Yes, but it is multipurpose</p> <p>R: How equipped is your Physics laboratory?</p> <p>T: The laboratory is well equipped</p> <p>R: How often do you expose students to physics practical?</p> <p>T: I always expose them to physics practical after teaching the topic</p> <p>R: Do you give students take home assignments?</p> <p>T: Yes</p> <p>R: How often do you mark the assignments?</p> <p>T: I always mark the assignment as and when its due</p> <p>R: How frequent do you make use of instructional materials for teaching of Physics?</p>

		<p>T: Very frequent</p> <p>R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?</p> <p>T: I improvise in case of non-availability of materials</p> <p>R: What can you say about the performance of Physics students based on this environment?</p> <p>T: They perform excellently</p> <p>R: In your own view, how would you rate the performance of your students in Physics?</p> <p>T: 85%, excellent performance</p> <p>R: Is location of school has influence in academic performance of students in Physics?</p> <p>T: Yes. Because they are in urban areas, they have adequate apparatus. They have well equipped library and they have access to internet facilities</p> <p>R: Do you agree that students in rural areas perform other than students in urban areas?</p> <p>T: No. urban areas performed better than rural.</p> <p>R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?</p> <p>T: I teach students well. I ensure that they are given assignments, mark the assignments and motivate the students</p>
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4.2.2. DISCUSSION AND FINDINGS

Mr. John had been teaching physics for the past sixteen (16) years. He was an experienced teacher who could really affect knowledge with regard to teaching and learning activities. The environment being an urban area was well conducive for teaching and learning. The school had a multipurpose laboratory, which was well equipped.

Since practical is part of Physics, Mr. John always exposed his students to Physics practical after teaching the theory. He gave them assignments and marked them without any delay. He was of the view that when assignments are given to students and marked promptly, students will realize their mistakes and adjust appropriately where necessary.

He made frequent use of instructional materials for teaching of Physics and in case of non-availability, he ensured improvisation of the materials. His students performed excellently in physics.

Mr. John stressed that the location of school had immense influence in academic performance of his students in Physics. This was because of adequate apparatus that had been put in place. Not only that, his school had a standard, well-equipped library for students to read and have access to materials that will update their knowledge. Students also had access to internet facilities.

He vehemently agreed that students in urban areas perform better than students in rural areas due to necessary facilities in place. This is in line with Arnold et al, 2005 which indicated that the educational aspirations of students who study in rural areas lag behind those of their urban counterparts.

As a Physics teacher, Mr. John said he played key role in enhancing better performance of students in Physics in his school. He taught the students well, ensured that they are given assignments, marked the assignments and motivated the students for better academic performance.

C. GENDER

TABLE 4.2: Reveals the characteristics that showed the performance of male students in an urban area. The focus was on the interview conducted.

THEME	CATEGORY	CHARACTERISTICS
GENDER	MALE	<p>R: Is gender a disposing factor in the choice of Physics in secondary school? If yes why?</p> <p>T: Yes. Male students offer Physics more than female students</p> <p>R: It is often said that “males are more science oriented than females” would you agree to this statement</p> <p>T: As I have said earlier, males are more science oriented than female</p> <p>R: Does family background have influence on students’ academic performance in Physics? If yes, how?</p> <p>T: Yes learned parents would always want the best for their children by so doing, they buy textbooks for them, encourage them and put them in extra mural lesson</p> <p>R: In African settings, there is always preference for males, of what effect is this to academic performance of students in Physics?</p> <p>T: Preference for males will only encourage males to perform better at the expense of the females</p>

		<p>R: Based on your environment, which of the gender do you think has interest in Physics more and why?</p> <p>T: Males. They are always active in the class. They ask questions and they are actively involved in physics practical</p> <p>R: Based on your teaching experience, over the years, rate the performance of male students and female students in your school?</p> <p>T: 85%, excellent performance</p> <p>R: How do you treat boys and girls offering Physics in your school? Any preference for any of the gender?</p> <p>T: I treat them equally. No preference for any of the gender in order to avoid hatred for the teacher and the subject</p> <p>R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?</p> <p>T: Yes. Most students normally prefer male Physics teachers because they believe male teacher can adequately impact knowledge</p>
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4.2.3. DISCUSSION ON THE FINDINGS:

Mr. John opined that gender is a disposing factor in the choice of Physics in secondary school. The Male students offer Physics more than female students. The males are more science oriented than female. This is in line with Iwu, 2017 assertion that female participation in science, mathematics and technology is very low.

The influence of family background on students' academic performance of students in Physics cannot be overemphasized. Learned parents would always want the best for their children by so doing; they buy textbooks for them, encourage them and put them in extra mural lesson.

In African settings, there is always preference for males this will go a long way to encourage males to perform better at the expense of the females. Male students have interest more than the female students do. They always pay rapt attention to the lesson and actively involved in class activities. They asked questions and they participated fully in Physics practical.

Mr. John having taught Physics for the past sixteen years stressed that the rate of performance of male students to female students in his school was excellent. This strongly indicated that male student performed better than female students did in his school.

Mr. John had no special treatment for any of the gender. Both males and female students were treated equally to avoid hatred for the teacher and the subject being taught. He, however, stated that preference for the gender of teacher could enhance academic performance of students in Physics. Most students normally preferred male Physics teachers because they believe male teachers could affect knowledge effectively.

D. CLASSROOM OBSERVATION: Mr. John was observed while teaching in the laboratory.

Table 4.3: shows the characteristics of classroom teaching in an urban area.

Mr John: MJ Student (Female): SF

THEME	CATEGORY	CHARACTERISTICS
TEACHER AND EFFECTIVE TEACHING	CONTENT CONTEXT STUDENT UNDERSTANDING	MJ: The topic for today's lesson is refraction. MJ: What is refraction?

		<p>SF: Refraction is the bending of light rays when it passes from one medium to another.</p> <p>MJ: State the two laws of refraction. Student (female): The incidence ray, the reflected ray and the normal at the point of incidence all lay at the same plane. (The students could not state the second law)</p> <p>MJ: The second law states that the ratio of the sine of angle of incidence to the sine of angle of refraction is constant.</p> <p>MJ: Refraction through triangular and rectangular prism (teacher wrote the topic on the chalkboard)</p> <p>MJ: Light travels with the same speed on a straight line between two points in the same medium (explanation). That one of the properties of light is that light travels on a straight line.</p> <p>MJ: Look at rectangle ABCD as being drawn on the chalkboard (demonstration) This is where to place the normal on the rectangle. You will be given a rectangular glass block to work with. Trace the edges and place it on the drawing sheet.</p> <p>MJ: The following are the terms used in reference to light waves. 1. Incident ray, 2. Refracted ray, 3.</p>
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		<p>Angle of incidence 4. Angle of refraction. The incident ray is the light ray moving through the air glass boundary. The refracted ray is the path of a ray in the glass medium. Angle of incidence is the angle the incidence ray makes with the normal.</p> <p>MJ: Answer the following questions. (a) State the principle of reversibility. (b) State two laws of refraction. (c) Differentiate between real image and virtual image. (d) Define the following terms (i) angle of incidence (ii) angle of refraction (iii) incident ray (iii) refracted ray.(evaluation)</p>
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4.2.4. DISCUSSION ON THE FINDINGS

Mr. John is teaching in a multipurpose laboratory. Some set of students were performing Physics practical on one side of the laboratory. Before the commencement of the lesson, the teacher made frantic efforts to warn the students not to disturb his class and the students promised to comply. Noise could really hamper effective teaching and learning processes since it would promote lack of concentration on the part of the students.

The laboratory was spacious with so many charts pasted on the wall. The laboratory was neat and the students settled down for lesson. The teacher introduced the topic to the students by asking them what refraction was. The prior knowledge taught is in line with the topic. A female student in the class defined refraction as the bending of light rays when it passes from one medium to another. Mr. John then asked the students to state the two laws of refraction. Another female student stated that the incidence ray, the reflected ray and the normal at the point of incidence all lie at the same plane. The students could not state the second law. So,

the teacher stated that the ratio of the sine of angle of incidence to the sine of angle of refraction is constant. The teacher's prior knowledge was okay because it had a link with the topic. When prior knowledge is introduced in any lesson presentation, it would greatly enhance quality teaching and eventually improve students' academic performance. The teacher got the students involved in the lesson. This was observed when the students answered the questions thrown to them by the teacher. This is learner centered due to students' involvement in any teaching and learning activities.

After the explanation, the teacher then wrote the topic on the chalkboard, which was refraction through triangular and rectangular prism. The teacher illustrated that light travels with the same speed on a straight line between two points in the same medium. The teacher told the students that one of the properties of light was that light travels on a straight line. He demonstrated this by drawing rectangle ABCD on the chalkboard. The demonstration method was good but the students understood the topic a little. The teacher then showed the students where to place the normal on the rectangle. He said that each student will be given a rectangular glass block to work with and they will trace the edges and place it on the drawing sheet. Mr. John could have brought a rectangular glass block out for the students to see instead of drawing it on the board. The contextual knowledge was not adequate since no resource was made available during the teaching. Teaching becomes effective when there is adequate utilization of instructional materials. It helps to improve academic performance of students.

The teacher then explained and wrote the terms used in reference to light waves on the chalkboard as follows: incident ray, refracted ray, angle of incidence and angle of refraction. The incident ray is the light ray moving through the air glass boundary. The refracted ray is the path of a ray in the glass medium. Angle of incidence is the angle the incidence ray makes with the normal. The teacher did not evaluate the students on the topic taught. He went ahead to give them assignment. When students are not

thoroughly evaluated at the end of the lesson, the teacher will not be able to assess the students' level of understanding about the topic.

His instruction was also characterized by teaching methods of demonstration, lecture and question and answer. Illustrations and examples were the explanatory frameworks.

The location being urban provided the necessary ground for teaching and learning of physics. The female students played active role in the class activity. This was observed in the way and manner in which they answer questions in the class. Since the teaching was done in the laboratory, it was observed that despite being a multipurpose laboratory, the school had adequate facilities in place to facilitate easy teaching and learning activities.

4.3. CASE 2 (MS JONES)

4.3.1. Data presentation

In this section, data is presented.

A. LOCATION

Table 4.4: reveals the characteristics that showed performance of students in an urban area. The focus was on the interview conducted.

Researcher: R

Respondent: T

THEME	CATEGORY	CHARACTERISTICS
LOCATION	URBAN	<p>R: For how long have you been teaching Physics?</p> <p>T: For the past 28 years</p> <p>R: How conducive is this environment for teaching and learning?</p> <p>T: The environment has been fair</p> <p>R: Do you have Physics laboratory</p> <p>T: We have a mini not up to a standard laboratory</p> <p>R: How equipped is your Physics laboratory?</p> <p>T: We have materials that are really working but nowhere to store them</p>

		<p>R: How often do you expose students to physics practical?</p> <p>T: Once there is practical work in the theory to do, I teach them and I organize for the practical</p> <p>R: Do you give students take home assignments?</p> <p>T: Yes I do</p> <p>R: How often do you mark the assignments?</p> <p>T: When they submit the work and when am opportune at my leisure time I mark</p> <p>R: How frequent do you make use of instructional materials for teaching of Physics?</p> <p>T: I do use them nearly each teaching because you can't teach physics as an abstract subject, so the students need to see what you teach them</p> <p>R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?</p> <p>T: I do improvise. I use improvised materials</p> <p>R: What can you say about the performance of Physics students based on this environment?</p> <p>T: Particularly in my school, their performance has been so fair, they have been cooperating and they have been having good results</p> <p>R: In your own view, how would you rate the performance of your students in Physics?</p> <p>T: They are above average</p> <p>R: Is location of school has influence in academic performance of students in Physics?</p> <p>T: The location will not affect. What will affect most is the teacher handling the subject and probably once we are in the city, the location will not have any adverse (negative) effect on the teaching and the performance of the students.</p> <p>We don't expect any bad performance once the teachers are the same all over but majority of the students in the rural areas are not keen</p>
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		<p>about education. If we have some that have interest, they can perform equally good as people in the urban</p> <p>R: Do you agree that students in rural areas perform other than students in urban areas?</p> <p>T: We don't expect people in the rural to perform better than the urban areas because in urban, you have necessary or relevant equipment to teach the students and the students are being exposed to practical more than the students in the rural. Likewise, we have apparatus and equipped teacher in the urban than rural</p> <p>R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?</p> <p>T: I did encourage them when they were in the junior school, that they should face their basic science very well, that Physics deals with day-to-day activities nearly all things that we made mention that is the topics in Physics are the ones you can see when you talk of Archimedes principles, fetching of water, the electricity and so on. What it is, things that we can see, so we try as much as possible to make Physics real, to be at home with the students</p>
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4.3.2. DISCUSSION ON THE FINDINGS:

Ms Jones had been teaching Physics for the past 28 years. She was an experienced Physics teacher who taught in various schools for many years. According to her, the environment had been fair for teaching and learning.

The school had a mini laboratory that was not up to a standard laboratory. They had adequate materials that were really working but nowhere to store them. This is in line with Usaini et al. (2015) that schools in urban areas have adequate facilities than those in the rural areas. Students were exposed to Physics practical once there was practical work in the theory to do. The school being an urban school had enough equipment; as a result, students were exposed to practical. The practical aspect of Physics enabled the students to perform well in both internal and external examinations.

Ms Jones gave students take home assignments and marked at an opportune time. She made use of instructional materials nearly each teaching because physics is a science subject that could not be taught as an abstract subject. Students should see what they were being taught. In case of non-availability of instructional materials, she used improvised materials to achieve effective teaching. The performance of Physics students in her school had been so fair, students used to cooperate and they had good results.

Ms Jones was of the view that location of school would not influence academic performance of students in Physics. What would affect most was the teacher handling the subject and probably once we were in the city, the location would not have any adverse (negative) effect on the teaching and the performance of the students. Regardless of any location, bad performance was not expected from the students since the teachers were the same all over but the students in the rural, majority of them were not keen about education if we had some that had interest; they could perform equally well as people in the urban

Ms Jones disagree that students in rural areas perform better than those in urban areas. Students in urban areas performed better than those in the rural because of necessary or relevant equipment were readily provided to teach the students and the students would be exposed to practical more than the students in the rural. This is in line with Ogunkoya & Fatoyinbo, (2009) which found statistically significant differences in

students' science achievement in favor of urban schools as compared to rural schools.

In order to enhance better performance of students in Physics she encouraged her students when they were in the junior school that they should face their basic science very well. That physics deals with day-to-day activities. Nearly all things that were mentioned that is the topics in physics are the ones you can see. She tried as much as possible to make physics real, to be at home with the students.

B. GENDER

Table 4.5: reveals the characteristics that showed the performance of male students in an urban area. The focus was on the interview conducted.

THEME	CATEGORY	CHARACTERISTICS
GENDER	MALE	<p>R: Is gender a disposing factor in the choice of physics in secondary school? If yes why?</p> <p>T: The case of gender should not cause a barrier in studying Physics but at times female students run away from Physics, it is because of the Mathematic inside because the language of Physics is Mathematics. So, if that should be the case, female can run away but we don't expect such. It should be at equal rate or equal ground. Like boys only or girls only, they do perform and offer Physics. So, gender should not be a disparity for choice</p> <p>R: It is often said; "males are more science oriented than females" would you agree to this statement?</p> <p>T: well, I could not agree since am a female teacher. I always encourage the girls to offer sciences. It is not only the boys or men that you see in the world of science. The girls also should perform better in Physics and</p>

		<p>generally in science. So gender disparity should not come in. I encourage girls because I'm a female teacher. I also encourage the boys as well. That once you can have a female teacher teaching you then what stops you taking that subject and performing better.</p> <p>R: Does family background have influence on students' academic performance in Physics? If yes, how?</p> <p>T: Yes, it will affect. Because we have some educated people that want their wards to be a medical doctor, to be an engineer, pilot or this and that. Once they know the importance of this subject, they can tell their ward to offer it. But if people don't know anything concerning science or even education at all, anyone that comes way they tell their child to pick it or tailored towards that. The family background of such can be changed positively</p> <p>R: In African settings, there is always preference for males, of what effect is this to academic performance of students in Physics?</p> <p>T: That is African settings that once you are a boy or a male child, it is you that will carry the name of the family forward they will now want their names to be heard all over the world. They will now encourage such to offer subject that will be of good advantage to the community or their own family</p> <p>R: Based on your environment, which of the gender do you think has interest in Physics more and why?</p> <p>T: Looking at the population vis-à-vis the boys. The boys are of 60% the girls 40%</p>
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		<p>R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?</p> <p>T: We have some girls that know the subject better than the boys. Let say 75:25</p> <p>R: How do you treat boys and girls offering Physics in your school? Any preference for any of the gender?</p> <p>T: I treat them equally once they are students under me and I want them to perform better to make it. No gender disparity.</p> <p>R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?</p> <p>T: The gender has many effects but I do encourage the two of them because the boys according to education female will tend towards the males and males will tend towards the female. If it is a male teacher that is teaching them you will see many female students will offer that particular subject that the male teacher is teaching. However, if we have some girls that are coming because they have interest in the subject and the teacher that is teaching. That's why we have girls coming in for science but if not boys will perform better</p>
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4.3.3. DISCUSSION AND FINDINGS

Ms Jones was of the view that gender should not be a disposing factor in the choice of physics in secondary school. The case of gender shouldn't cause a barrier in studying physics but at times female students ran away from physics as a result of the Mathematic inside because the language

of Physics is Mathematics. Therefore, if that should be the case, female could run away from Physics but such attitude was not expected. It should be at equal rate or equal ground. Like boys only or girls only, they performed well when they offered Physics. Therefore, gender should not be a disparity for choice.

Ms Jones could not agree that males are more science oriented than females. She always encouraged the girls to offer sciences. She stressed that in the world of science both genders are performing greatly. The girls also should perform better in Physics and generally in science. Therefore, gender disparity should not come in. I encouraged boys and girls to take the subject with utmost seriousness. That once you could have a female teacher teaching you, then what stopped them from taking subject and performing better?

Ms Jones was of the opinion that family background had influence on students' academic performance in Physics. We had some educated people that really wanted their wards to be medical doctors, engineers, pilots or this and that. Once they knew the importance of Physics, they could advise their wards to offer it. But those who did not know anything concerning science or even education at all, anyone that came their way they told their child to pick it or tailored towards that.

In African settings, there is always preference for males, that once you are a boy or a male child, it is you that will carry the name of the family forward they will now want their names to be heard all over the world. They will now encourage such to offer subject that will be of good advantage to the community or their own family.

Looking at the population of this school the boys had more interest in Physics as opposed to girls. Based on my teaching experience over the years, the male students performed better than the female students in this school did. The rate of performance is 75:25

Ms Jones treated the Physics students equally since she wanted them to perform better. She did not prefer any of the gender. No gender disparity.

In addition, preference for the gender of teacher could affect academic performance of students in Physics. The gender had many effects but she used to encourage both of them because the boys according to education female would tend towards the males and males would tend towards the female. If a male teacher were teaching physics, you would see many female students offering it. However, if we have some girls that are coming because they have interest in the subject and the teacher that is teaching it, then we have girls coming in for science, but if not, boys will perform better.

C. CLASSROOM OBSERVATION

Table 4.6: reveals the characteristics of classroom teaching in an urban area.

Ms. Jones: MSJ

THEME	CATEGORY	CHARACTERISTICS
TEACHER AND EFFECTIVE TEACHING	CONTENT CONTEXT STUDENTS UNDERSTANDING	<p>MSJ: The topic of today is reflection of light through curved or spherical surfaces as the topic of the lesson.</p> <p>MSJ: When we have a concave mirror and an object is placed in front of it, the image is formed on the screen.</p> <p>MSJ: She demonstrated this by showing the students on the chalkboard. She told the students that the focal length of a concave mirror is positive while that of a convex mirror is negative (demonstration method).</p> <p>MSJ: a real image has real object and real image. A virtual image is formed at the back of the screen and the focal length is negative. Mrs. Jones: look at the examples on how to calculate the image distance and the image height.</p>

		<p>MSJ: Let us look at topic- refraction. Refraction is the change in the direction of the path of light. Light changes its direction as it strikes the surface of a material and comes in another direction (explanation method).</p> <p>MSJ: (demonstration is done by using a beaker) Pour water into the beaker and drop a substance inside it</p> <p>MSJ: the ray of light would enter and the materials would appear to jump up. The material can move from glass to water and from water to glass. Light passes from one medium to another. It moves from two media but that of reflection we have regular reflection and scattered reflection. The regular is when the surface is smooth or plane. The irregular one is when we have scattered or diffused reflection of light. The change in path now involves two media. The beaker from dense medium to a denser medium.</p> <p>MSJ: the speed of light in air is different from the speed of light in water. (Explanation). The density is also different. Therefore, refraction is the change in direction of light from air or water to glass.</p> <p>MSJ: Look at this demonstration on the drawing sheet. Trace the outline of the glass block on the drawing sheet. Place the pins and observed the pins on the glass block. Look at the search pins. When viewed, refraction is then obtained.</p>
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		<p>MSJ: In the law of reflection, the angle of incidence is equal to the angle of reflection. The angle of incidence at the point of normal and the angle of reflection at the point of incidence all are in the same plane. Refraction takes place between two media. The ratio of the sine of incidence to the sine of refraction is always constant for a given media. This is called Snell's law</p> <p>$\sin i / \sin r$. refraction is the bending of light ray as it crosses the boundary between two media.</p> <p>MSJ: I will end this lesson by differentiating between real and apparent depth. She said that real depth is the actual depth while apparent depth is when the substance appears jump up</p>
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4.3.4. DISCUSSION AND FINDINGS

Ms. Jones topic was well explanatory. The topic was reflection of light through curved or spherical surfaces. When we have a concave mirror and an object is placed in front of it, the image is formed on the screen. She used demonstration method to really explain to students to ensure that the students grasp the topic very well. For better academic performance of students, thorough explanation and demonstration are needed for effective teaching and learning.

Ms. Jones told the students that the focal length of a concave mirror is positive while that of a convex mirror is negative. A real image has real object and real image. A virtual image is formed at the back of the screen and the focal length is negative. Mrs. Jones then gave examples on how to calculate the image distance and the image height.

Ms. Jones introduced another topic, refraction, to the students. Refraction is the change in the direction of the path of light. Light changes its direction as it strikes the surface of a material and comes in another direction (explanation method).

Ms. Jones contextual knowledge is okay. She used adequate resources to ensure effective teaching. She believed that for any efficient teaching, students learn quickly when they see things than when it is abstract. To demonstrate refraction, she made use of a beaker. She poured water into the beaker and dropped a substance into it. The ray of light would enter and the materials would appear to jump up. The material can move from glass to water and from water to glass. Light passes from one medium to another. It moves from two media but that of reflection we have regular reflection and scattered reflection. The regular is when the surface is smooth or plane. The irregular is reflection of light, when we have scattered or diffused. The change in path now involves two media that is, the beaker from a dense medium to a denser medium.

Ms. Jones explained that the speed of light in air is different from the speed of light in water (explanation). The density is also different. Therefore, refraction is the change in direction of light from air or water to glass.

Ms. Jones told the students to look at the drawing sheet in front of her. Trace the outline of the glass block on the drawing sheet. Place the pins and observed the pins on the glass block. Look at the search pins. When viewed, you would notice that refraction had occurred.

Ms. Jones stressed that in the law of reflection, the angle of incidence is equal to the angle of reflection. The angle of incidence at the point of normal and the angle of reflection at the point of incidence all are in the same plane. Refraction takes place between two media. The ratio of the sine of incidence to the sine of refraction is always constant for a given media. This is called Snell's law $\sin i / \sin r$. refraction is therefore, the bending of light ray as it crosses the boundary between two media.

Ms. Jones ended the lesson by differentiating between real and apparent depth. She said that real depth is the actual depth while apparent depth is when the substance appears jump up. Ms. Jones lesson was, however, teacher centered. It should have been more learners centered. Students ought to play maximum contribution during the teaching and learning process. Students should have been asked questions to evaluate them. Effective teaching enhances adequate academic performance.

4.4. CASE 3

4.4.1. Data presentation

In this section, data is presented.

A. LOCATION

Table 4.7: reveals the characteristics that showed the performance of students in a rural area. The focus was on the interview conducted.

Researcher: R

Respondent: T

THEME	CATEGORY	CHARACTERISTICS
LOCATION	RURAL	<p>R: For how long have you been teaching Physics?</p> <p>T: Well, I have been teaching physics for the past 25 years.</p> <p>R: How conducive is this environment for teaching and learning?</p> <p>T: The environment is conducive.</p> <p>R: Do you have Physics laboratory</p> <p>T: I will say yes. It is multipurpose</p> <p>R: How equipped is your Physics laboratory?</p> <p>T: The laboratory is not well equipped</p> <p>R: How often do you expose students to Physics practical?</p> <p>T: They do practical always</p> <p>R: Do you give students take home assignments?</p> <p>T: I give them take home assignment to allow them to learn more</p> <p>R: How often do you mark the assignments?</p>

		<p>T: I mark the assignment the following day</p> <p>R: How frequent do you make use of instructional materials for teaching of Physics?</p> <p>T: I use instructional materials always because physics deals with what you can see and when students see things, they understand better</p> <p>R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?</p> <p>T: I improvise anytime instructional materials are not available</p> <p>R: What can you say about the performance of Physics students based on this environment?</p> <p>T: The students perform well</p> <p>R: In your own view, how would you rate the performance of your students in Physics?</p> <p>T: 80% performance</p> <p>R: Is location of school has influence in academic performance of students in Physics?</p> <p>T: Yes. I will say that location can adversely affect students' academic performance. Not only in physics but also in other subjects too. The students in the urban areas have access to internet, they buy textbooks always, their parents are more enlightened and they want the best for their ward. They also have well equipped libraries for students. In this school, we have no library. The laboratories in urban areas have adequate apparatus for physics practical. Location really helps those in urban areas than rural</p> <p>R: Do you agree that students in rural areas perform better other than students in urban areas?</p> <p>T: It depends. Teachers are the same all over. We have the same qualifications. The problem of</p>
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		<p>not performing well lies with the students and not the teachers. But one expects better performance from urban than rural based on access to information technology</p> <p>R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?</p> <p>T: As a physics teacher, I always go to class and teach the students. I encourage the lazy ones to read more. I give them assignments and mark them for them to know their mistakes. I also take them extra teaching to impact adequate knowledge and finish the syllabus for them</p>
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4.4.2. DISCUSSION AND FINDINGS

Mr. clement had been teaching physics for the past 25 years. He was an experienced physics teacher. His school being a rural area was very conducive for teaching and learning. The school had a multipurpose laboratory, which was not well equipped.

Mr. clement always exposed his students to physics practical. He gave students take home assignment to allow them to learn more and marked the assignments the following day. He used instructional materials always because physics deals with what you can see and when students see things, they understand better. In case of non-availability of instructional materials, he improvised materials to achieve effective teaching.

Mr. clement reiterated that his students performed excellently well in physics. He mentioned that location could adversely affect students' academic performance, not only in physics but in other subjects too. The students in the urban areas had access to internet, they buy textbooks always, their parents are more enlightened and they want the best for their ward. They also have well equipped libraries for students. This is in line with Adebule and Aborisade (2013) in their studies that claimed that

students in urban setting could have more access to libraries, laboratories, etc. than those in rural setting. Mr. Clement School had no library. The laboratories in urban areas have adequate apparatus for physics practical. Location really helps those in urban areas than rural.

Mr. clement said teachers are the same all over. Teachers have the same qualifications both in rural and urban. The problem of not performing well lies with the students and not the teachers. However, one expects better performance from urban than rural based on access to information technology.

As a physics teacher, he always went to class to teach the students well. He encouraged the lazy ones to read more. He gave students assignments and marked them to know their mistakes. He also took them extra teaching to affect adequate knowledge and finish the syllabus for them.

B. GENDER

Table 4.8: reveals the characteristics that showed the performance of male students in a rural area. The focus was on the interview conducted.

THEME	CATEGORY	CHARACTERISTICS
GENDER	MALE	<p>R: Is gender a disposing factor in the choice of physics in secondary school? If yes why</p> <p>T: Yes. One notice that female students fear physics more than the male students</p> <p>R: It is often said; “males are more science oriented than females” would you agree to this statement?</p> <p>T: Yes. I agree with it because most female students fear physics because of the calculations involved. Most girls dislike mathematics related subjects.</p>

		<p>R: Does family background have influence on students' academic performance in Physics? If yes, how?</p> <p>T: family background has influence greatly. One finds out that if students have educated parents, their parents do encourage them to do science especially Physics so that they can become medical doctors or engineers in future. The more they encourage them, the more they are actively involved in the subject because they have a career to pursue in future. The uneducated parents may not bother, so much about this just do any course. No motivation at all.</p> <p>R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?</p> <p>T: It has really affected academic performance. Both male and female students should be encouraged to study physics. Both are important in the society. There should be no gender discrimination</p> <p>R: Based on your environment, which of the gender do you think has interest in Physics more and why?</p> <p>T: Male students have interest more than female students. This is noticeable in the class when students are asked questions. The boys always ask questions more and do assignment promptly</p> <p>R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?</p> <p>T: 78% performance</p> <p>R: How do you treat boys and girls offering Physics in your school? Any preference for any of the gender?</p> <p>T: I treat them equally. I have no special treatment for any of them. In fact, preferential</p>
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		<p>treatment should be discouraged to enhance effective teaching and learning</p> <p>R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?</p> <p>T: Yes. Most students prefer male teachers to teach Physics. They believe that male teachers can handle the science subjects effectively. No wonder you see girls often times offering Physics because they preferred a male teacher than a female teacher.</p>
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4.4.3. DISCUSSION ON FINDING

Mr. Clement opined that gender was a disposing factor in the choice of Physics in secondary school. According to him, one noticed that female students fear Physics more than the male students based on this locality do. He was in support of the view that male students are more science oriented than female students are. Most female students fear Physics because of the calculations involved. Most girls dislike Mathematics related subjects.

Mr. Clement mentioned that family background had a greater influence on students' academic performance. Students who had educated parents received enough encouragement from their parents to do science especially Physics so that they could become medical doctors or engineers in future. The more they encouraged them, the more they would be actively involved in the subject because they had a career to pursue in future. The uneducated parents might not bother so much about this, they just told their wards to do any course. No motivation at all.

Mr. clement reiterated that the preference for males in African setting had really affected academic performance of students. Both male and female students should therefore be encouraged to study Physics. Both genders are quite important in the society. There should be no gender discrimination.

Male students had interest in Physics more than the female students did. This was noticeable in the class when students were asked questions. The boys always asked questions more and did assignment promptly

Based on Mr. Clement teaching experience over the years, the rate of performance of male students was higher than that of female students in his school. There had been excellent academic performance on the part of the male students.

Mr. Clement treated boys and girls offering Physics in his school equally therefore, there had been no special treatment for any of them. Preferential treatment should be discouraged to enhance effective teaching and learning.

In this school, most students preferred male teachers to teach Physics. They believe that male teachers could handle the science subjects effectively. No wonder girls often times offered Physics because they preferred a male teacher than a female teacher.

C. CLASSROOM OBSERVATION

Table 4.9: reveals the characteristics of classroom teaching in a rural area.

Mr. Clement: MC Students: S Student (Female) Student (Male)

THEME	CATEGORY	CHARACTERISTICS
TEACHING AND EFFECTIVE TEACHING	CONTENT CONTEXT STUDENTS' UNDERSTANDING	<p>MC: The topic for today is measurement.</p> <p>MC: what is atom?</p> <p>S: none of them could define atoms.</p> <p>MC: Atom is the smallest particles that take place in the chemical reaction.</p> <p>MC: Measurement can be classified into fundamental quantities or fundamental basics or derived units.</p> <p>MC: Fundamental quantities are length, time, mass and electric current. Out of these, time, length and mass are chosen. Derived units are obtained</p>

		<p>by multiplication, division and by the combination of the two or more fundamental quantities</p> <p>MC: Look at this example, area= length (l) x length (l). (Illustration by the use of local language to explain to the students). Volume is length (l) x length (l) x length (l). = l³.</p> <p>MC: Derived units are volume, area, power and momentum.</p> <p>MC: Copy this note on the chalkboard.</p> <p>SF: What is the difference between a long ruler and a short ruler?</p> <p>MC: during inter house sport competition a long ruler can be made use of that is for measurement of 100m and 200m. Carpenter, tailors, can use the short ruler and so on. (Misconception)</p> <p>MC: State three basic system used in science and engineering.</p> <p>S: (difficulty in answering the question)</p> <p>MC: Length, time and mass are the three basic units.</p> <p>MC: What do derived units mean?</p> <p>SM: Derived units can be obtained by combining two or more fundamental units or by multiplying or dividing.</p>
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4.4.4. DISCUSSION AND FINDINGS

Mr. clement classroom was very clean. The teacher ensured that the students settled down before the commencement of the lesson this affected the time allotted for the lesson because part of the time was used in settling the students down. The topic taught was on measurement. The teacher started by asking the students to define atoms but none of them could define it. He then defined atoms as the smallest particles that take place in the chemical reaction. Mr. Clement prior knowledge of the topic

was incoherent. He would have said, 'we take measurements in our day-to-day activities'. If you want to measure length, you make use of a ruler or tape rule. That student are familiar with these things. When students' prior knowledge of the topic is brought into limelight, they understand the topic better.

Mr. clement then stated that measurement can be classified into fundamental quantities or fundamental basics or derived units. Fundamental quantities are length, time, mass and electric current. Out of these, time, length and mass are chosen. Derived units are obtained by multiplication, division and by the combination of the two or more fundamental quantities, for example, area= length (l) x length (l). The man used his local language to explain to the students. When local language is incorporated into teaching and learning, it helps a lot in achieving the stated aims and objective of the lesson. Students pay rapt attention to the teacher and they understand the topic better. Volume is length (l) x length (l) x length (l). = l^3 . It is a derived unit, power and momentum too.

Mr. Clement then asked one of the students to write note on the chalkboard for students to copy. He was in the class monitoring the students ensuring that the notes were well copied. A student asked a question about the difference between a long ruler and a short ruler. The Physics teacher told the students that during inter house sport competition, a long ruler can be made use of and that is for measurement of 100m and 200m. Carpenter, tailors, can use the short ruler and so on. This is misconception on the part of the teacher. The teacher could have said short rulers are used for short distance measurements while long rulers are used for long distance measurements. The use of long ruler for long distance measurement could be cumbersome. A long tape rule can be used effectively for long distance measurement. Teachers on the chalkboard to rule and take measurement use long rulers. The teacher then asked the following questions from the students. State three basic systems used in science and engineering. The students found it difficult to answer the question until the teacher told them the answer again. In

terms of evaluation, the stated aims and objectives of the lesson was not achieved. Effective teaching goes a long way in enhancing students' academic performance.

During the teaching and learning activities, no resources were observed throughout the lesson. The students were not given any materials to observe. When there is non-availability of resources, the topic becomes abstract to the students and this would not enable them to comprehend easily.

Mr. Clement told the students that length, time and mass are the three basic units. He then asked the second questions- what derived units mean. A male student answered by saying that derived unit can be obtained by combining two or more fundamental units or by multiplying or dividing.

The environment being rural revealed low enrollment of students. There was no active participation of students in the class activity. The teaching was wholly teacher-centered devoid of learners' involvement. This would eventually result in poor academic performance of students in physics.

4.5. CASE 4

4.5.1. Data presentation

In this section, data is presented.

A. LOCATION

Table 4.10: reveals the characteristics that showed the performance of students in rural areas. The focus was on the interview conducted.

Respondent (T): **Researcher (R):**

THEME	CATEGORY	CHARACTERISTICS
LOCATION	RURAL	<p>R: For how long have you been teaching Physics?</p> <p>T: For the past fifteen (15 years)</p> <p>R: How conducive is this environment for teaching and learning?</p> <p>T: Very conducive</p>

		<p>R: Do you have Physics laboratory</p> <p>T: We have but only one laboratory</p> <p>R: How equipped is your Physics laboratory?</p> <p>T: The equipment is partially not really</p> <p>R: How often do you expose students to physics practical?</p> <p>T: We expose them to physics practical right form SS1. We have four periods in a week at 23144wqewleast two periods are set aside for practical</p> <p>R: Do you give students take home assignments?</p> <p>T: Yes I do</p> <p>R: How often do you mark the assignments?</p> <p>T: At the end of the last period, the assignment is marked</p> <p>R: How frequent do you make use of instructional materials for teaching of Physics?</p> <p>T: Every time we have physics. I bring instructional materials to teach them to explain to them so that they can understand better</p> <p>R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?</p> <p>T: We improvise for ourselves</p> <p>R: What can you say about the performance of Physics students based on this environment?</p> <p>T: Averagely they are good because of the environment we are</p> <p>R: In your own view, how would you rate the performance of your students in Physics?</p>
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		<p>T: Averagely they are good because some students will go to school without eating in the morning. Averagely they are ok</p> <p>R: Is location of school has influence in academic performance of students in Physics?</p> <p>T: Yes, it has affected their performance. They do came late at times to school</p> <p>R: Do you agree that students in rural areas perform better other than students in urban areas?</p> <p>T: Well it depends on the environment at times they dictate to them but here we don't do that</p> <p>R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?</p> <p>T: We started from elementary science so that they can understand better because most of them don't understand the word science so we started elementary science</p>
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4.5.2. DISCUSSION AND FINDINGS

Mr. Patrick had been teaching Physics for the past fifteen (15) years. According to him, the environment being a rural setting was very conducive to teaching and learning. The school had only one laboratory. The laboratory was not well equipped. Students were exposed to physics practical right from SS1. They had four periods in a week for physics and at least two periods were set aside for practical.

Mr. Patrick gave his students take home assignments and marked them at the end of the last period. He ensured effective use of instructional materials anytime he went to class to teach his students so that they could understand better. He however improvised the materials In case of non-

availability since Physics should not be taught in abstract. He reiterated that his students were averagely okay in terms of academic performance.

Mr. Patrick was of the opinion that location of his school had really affected the academic performance of students in Physics. Most students used to come late at times to school. Their lateness to school always affected them, as much of the class work would have been done before their arrival. Students that form the habit of coming late to school always have low academic performance compared to those that come to school early. Students in urban perform better than those in the rural areas because of necessary facilities put in place. This is in line with Owoeye (2002) & Onah (2011) in their separate studies, which indicated that schools in urban areas achieved more than schools in the rural areas in science subjects.

As a Physics teacher, Mr. Patrick played a key role to enhance better performance of students in Physics his school. For instance, he started from elementary science so that they could understand better because most of them did not understand the word science so we started from the basic science.

B. GENDER

Table 4.11: reveals the characteristics that showed the performance of male students in a rural area. The focus was on the interview conducted.

THEME	CATEGORY	CHARACTERISTICS
GENDER	MALE	<p>R: Is gender a disposing factor in the choice of physics in secondary school? If yes why?</p> <p>T: NO</p> <p>R: It is often said; “males are more science oriented than females” would you agree to this statement?</p> <p>T: Yes, I agree. The male concentrate more than female students</p> <p>R: Does family background have influence on students’ academic performance in Physics? If yes, how?</p>

		<p>T: Yes, the problem is at times most of them do not have textbooks. Their parents are local here. They don't buy textbook for them except mathematics and English other subjects, they don't buy it at all</p> <p>R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?</p> <p>T: In Africa, they believe that male students do not have problems unlike female. They concentrate on male students even if they have problems the education will continue</p> <p>R: Based on your environment, which of the gender do you think has interest in Physics more and why?</p> <p>T: Male students. Male students can do any form of practical. They improvise unlike females they prefer to learn fashion designing. However, the male students can move on, they can learn computer work. So that in terms of physics it helps them a lot</p> <p>R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?</p> <p>T: In my present school now, male students' performance to female students is 70- 30%</p> <p>R: How do you treat boys and girls offering Physics in your school? Any preference for any of the gender?</p> <p>T: We treat them equally. No discrimination.</p> <p>R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?</p> <p>T: Male teacher moves with the students unlike female counterpart, they are too harsh a little bit. They work together; they rub minds with the students</p>
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4.5.3. DISCUSSION AND FINDINGS

Mr. Patrick stated that gender was not a disposing factor in the choice of physics in secondary school. He however, agreed that male students are

more science oriented than female students. The male students exhibit more concentration than the female students.

Mr. Patrick agreed that family background had influence on students' academic performance in Physics. Most parents in this locality were very local. This could be deduced in their inability to buy textbook for their wards. Those that eventually bought textbooks would only buy Mathematics and English. The purchase of other textbooks including physics would be jettison.

Mr. Patrick supported that in African settings, preference for males had been on the increase. More concentration and attention were given to male children believing that if they had problems along the way, their education would still continue unlike the female children who could be impregnated along the way and their education would stop abruptly.

Male students had more interest in physics than the female students did. Male students could do any form of practical. The male students showed active participation in the class and did assignments promptly unlike the female students. This helped them to perform better other than female students.

Mr. Patrick mentioned that in his present school, male students performed better than female students did. He said that equal treatment was given to boys and girls offering Physics in his school without any form of gender discrimination.

Mr. Patrick agreed that the gender of teacher greatly enhanced academic performance of students in Physics. Male teacher moved with the students unlike female counterpart, they were a little bit harsh. Male teachers interacted well and rubbed minds together with the students. When there are proper students-teachers relationship put in place, students would be ready to listen to the teacher and perform any given task.

C. CLASSROOM OBSERVATION

Table 4.12: reveals the characteristics that showed classroom teaching in a rural area.

Mr Patrick: MP Student: S Student (Male): SM Student (Female): SF

THEME	CATEGORY	CHARACTERISTICS
TEACHER AND EFFECTIVE TEACHING	CONTENT STUDENT UNDERSTANDING	<p>MP: Speed, Velocity and Acceleration.</p> <p>MP: What speed?</p> <p>SF: Speed is a distance moved in unit of time</p> <p>SM: Speed is the rate of change of distance moved with time.</p> <p>MP: The unit of speed is m/s.</p> <p>MP: Define velocity.</p> <p>SM: Velocity is the rate of change of displacement with time.</p> <p>MP: Differentiate between speed and velocity.</p> <p>SM: Speed is a scalar quantity while velocity is a vector quantity.</p> <p>MP: Define acceleration.</p> <p>SF: Acceleration is the rate of change of velocity with time.</p> <p>MP: Velocity is a vector quantity and the unit is m/s^2.</p> <p>MP: The equation of motion. Let the initial velocity be u, acceleration be a, final velocity v, and time taken t. Acceleration</p>

		<p>is the change in velocity over time taken i.e. $a = \frac{v-u}{t}$. then to get final velocity v, $v = u + at$. (demonstration method)</p> <p>MP: The second law of motion is $s = ut + \frac{1}{2}at^2$ and explained its derivation. The third law as $v^2 = u^2 + 2as$.</p> <p>MP: The first law of motion connects all the parameters. If you are given questions to solve, you must write out all they are given first. For example, a bus travelling with an initial velocity of 60km/hour accelerates uniformly at 5m/s^2. Calculate the velocity after 2 minutes.</p> <p>MP: The teacher used the first equation of motion to solve the questions on the chalkboard. That is, $v = u + at$.</p> <p>MP: Solve this question. A body moving with an initial velocity of 13m/s accelerated uniformly at the rate of 10m/s^2 until it attained a velocity of 15m/s. What is the distance covered during this period?.</p> <p>SM: Attempted the question. (The teacher guided the student to first write the parameter first to make her work easier). The female eventually got the answer correctly.</p> <p>MP: A. what is speed? B. What is velocity? C. What is acceleration? (evaluation)</p>
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4.5.4. DISCUSSION AND FINDINGS

Mr. Patrick classroom was spacious and very neat except that the ceilings were broken which made the class very hot in the afternoon. The students concentrated well during the class activities.

Mr. Patrick started the lesson by writing the topic on the chalkboard. The topic of the lesson was on speed, velocity and acceleration. The teacher began by asking the students what speed is, based on their previous experience in physics. A female student answered the question that speed is a distance moved in unit of time. A male student said that speed is the rate of change of distance moved with time. The unit of speed is m/s. Mr. Jones previous knowledge was okay since the students answered the teacher correctly. The previous knowledge was in line with the new topic, which would enable the students to understand the topic well.

Mr. Patrick then asked the students to define velocity. This was answered by a male student that velocity is the rate of change of displacement with time. The teacher then asked the students to differentiate between speed and velocity. A female student answered the question. She said that speed is a scalar quantity while velocity is a vector quantity. In addition, the teacher told the students to define acceleration. This was well defined by another female student as the rate of change of velocity with time. The S.I unit of acceleration is m/s^2 . The lesson was learner centered because of students' involvement in the lesson activities.

He then moved to the next subtopic- the equation of motion. Let the initial velocity be u , acceleration be a , final velocity v , and time taken t . Mr. Patrick now gave the equation of acceleration as the change in velocity over time taken i.e. $a = \frac{v-u}{t}$. then to get final velocity v , $v = u + at$. The teacher demonstrated how the first law was obtained. He also gave the students the second law of motion as $s = ut + \frac{1}{2} at^2$ and explained its derivation. The third law as $v^2 = u^2 + 2as$. He explained to the students that the first law of motion connects all the parameters. He mentioned that if the students are given questions to solve, they must write out all they are

given first. For example, a bus travelling with an initial velocity of 60km/hour accelerates uniformly at 5m/s^2 . Calculate the velocity after 2 minutes. The teacher first solved the question on the chalkboard for the students using the first equation of motion. That is, $v = u + at$. Another question was written on the chalkboard. A body moving with an initial velocity of 13m/s accelerated uniformly at the rate of 10m/s^2 until it attained a velocity of 15m/s . What is the distance covered during this period? A female student attempted the question. The teacher guided the student to write the parameter first to make her work easier. The girl eventually got the answer correctly. The teacher also gave another two questions and one of the questions was solved by another female students. The teacher, however, concluded the lesson by asking the students the following questions based on the topic taught: A. what is speed? B. What is velocity? C. What is acceleration?

The environment was a rural setting. The classroom was not spacious to occupy the few students who offered physics. The approach of solving questions by students was wrong and this was observed in the way the teacher assisted the students on the chalkboard. There was no usage of instructional materials throughout the entire class activity.

4.6. FOCUS GROUP INTERVIEW

The focus group interview was meant to answer questions relating to why male students performed better than female students in Physics did. For each school, five male students and female students were selected for the interviews.

4.6.1. FOCUS GROUP INTERVIEW FOR BOYS IN SCHOOL 001 (URBAN)

This is an urban school, the male students found physics very interesting as a science subject because it deals with calculations. Physics is not a difficult subject according to the students. You can be asking why it is the simplest subject, although most students may consider physics as the most difficult subject in their own eyes but in my own eyes, physics is the

simplest subject. One of the male students said he solved physics always with his own reading timetable.

I found the theory aspect so difficult because when I worked it, I might find it difficult to get the answer but the practical I found it easy because it involved physical activities. As a student, I practiced physics always to understand it better.

There is a well-equipped Physics laboratory in my school. We are exposed to Physics practical every Tuesday, Thursday and Friday. Moreover, our physics teacher used to teach practical every time.

The male students did not always create unnecessary fear for physics. According to the student, in as much as he knew what he wanted to do, he focused on it and had the intention to read physics. I had no fear for physics. In terms of calculations, in as much as I could assimilate, and then know the method and the formula I would use for it so, I had no fear for physics

Male students are better than female students in Physics in my school are. They are better because the male students have courage of working physics and they have no fear in working physics because the female students in my class because they take what they don't get to people who are good in physics

My physics teacher is good and I am proud to say that my physics teacher is one of the best physics teachers in my school and his methods of teaching are very superb.

The student intended to do a career related to physics in future. He would like to be a medical doctor in future.

4.6.2. FOCUS GROUP INTERVIEW FOR GIRLS IN SCHOOL 001 (URBAN)

The female student found Physics very interesting because things done in our everyday life involved physics. Even in calculation when we know it we would be more excited to solve more.

The girls found Physics so easy to understand. It is a subject just like Mathematics because it deals with calculations. They solved physics calculations. A female student was of the opinion that the theory aspect of physics was difficult. Sometimes whenever you were having an examination or whenever you were having a test, there were some questions that even if you did not put more concentration, you would not be able to get the real answer of it. Physics could sometimes be likened to a twisted subject.

Physics was read twice in a day. In the morning and in the night because in the morning ones brain would be fresh and u would be able to understand the formulas because formulas gave clues to answers in physics.

The laboratory was well equipped because the necessary equipment needed for physics practical is readily available in the laboratory. Practical was not always done in my school.

One of the students reiterated she created unnecessary fear for physics especially the calculation aspect. The female student used to go to people that knows calculations very well, for them to put her through in calculations.

The male students are better than female students in Physics are. Most male students are more responsible than the females, sorry to say that, I am a female student. Saying the fact, male students, they want to know more unlike female students. Most of the female students are not responsible all they know about is just do unnecessary things, roaming about the school and do things that cannot even favor them. To my own perspective, the male students are better in every aspect in physics

Our physics teacher was very good, very intelligent, humble, and had passion for the job. We understood the way he taught us.

The female students intend to continue with discipline related to Physics in future. Because great physicists of old like Isaac Newton, they invented

things that were not in the world before and I as a science student, I want to invent things to make life more enjoyable for people.

4.6.3. FOCUS GROUP INTERVIEW FOR BOYS IN SCHOOL OO2 (URBAN)

The male student found physics very interesting that physics was not a difficult subject. That during practical, students were exposed to what we do every day. He loved Physics workings and as a result, he did not find the subject difficult.

Physics calculations were solved thrice in a week. According to the boys, there was no part of Physics that they found difficult because our teacher exposed everything to us including theory and even all the tough aspect

The male student read Physics always. In their school, they had a physics laboratory without adequate equipment like other schools. The male students said they were exposed to Physics practical every Friday once in a week.

Males do not create unnecessary fear for Physics because more time was devoted for it. Both female and male students were very good in Physics in my school. Our physics teacher happened to be an experienced teacher so his teaching style was excellent. We understand her teaching very well.

The male student intended to continue with discipline related to Physics in future because he wanted to become a medical doctor. He believed Physics would help him in surgery.

4.6.4. FOCUS GROUP INTERVIEW FOR GIRLS IN SCHOOL OO2 (URBAN)

One of the girls said that physics is very interesting since it is easy to read and learn. Physics is not a difficult subject as one can assimilate fast when reading it. According to one of the girls, she read Physics thrice in a week.

I found the theory aspect of Physics more difficult because of the calculations, which had many formulae so difficult to memorize. A girl said

that she read Physics on her own when lonely. She read Physics when the house became boring and in order not to waste her time watching films or doing any other things, she always took her Physics and read it.

The school had a Physics laboratory but too small to contain all the apparatus in the school. Physics practical was done every week, every Friday. A girl reiterated that she did not create unnecessary fear for physics. She found physics very easy to understand.

According to one of the female students, the male students performed better than the female students did in that school did. The male students focus their attention on their studies. They always liked to read and solve questions in Physics.

The teaching style of the Physics teacher was so superb. The teacher was rated as being a good teacher due to her ability to bring the students together like her own children. She taught the students very well effectively understand the topic. She exposed the students to practical work. She always ensured that she explained the topic well for the students to understand easily.

4.6.5. FOCUS GROUP INTERVIEW FOR BOYS IN SCHOOL 003 (RURAL)

A male student found Physics very interesting because he loved the calculations aspect.

Physics is not difficult because I found physics very easy to assimilate whenever he read it.

A male student did not solve calculations in physics frequently because he did not like the way his physics teacher normally taught them and he found it very hard to assimilate when reading Physics. The male student preferred the theory more than practical because when he read it he used to assimilate well but found the practical difficult. He read Physics every day and every time.

We had Physics laboratory in my school. Our physics laboratory was not well equipped. We were not well exposed to Physics practical. We did Physics practical once in a term and sometime we might not even do practical. One of the students created unnecessary fear for Physics because he did not like physics but liked to go for discipline related to Physics in future

According to the interview conducted, male students were better than female students in the school were because male students performed better in Physics calculations.

When a student was asked to rate the teaching style of his Physics teacher, he rated him so low due to his nonchalant attitude to work. Whenever he came to class, he would just copy notes for the students without any explanation. Sometimes he would just give them note and ask them to read it on their own.

A student said he intended to go for any course relating to Physics in future because he wanted to be an engineer.

4.6.6. FOCUS GROUP INTERVIEW FOR GIRLS IN SCHOOL 003 (RURAL)

Physics happened to be an interesting science subject more enjoyable than other science subjects were. I found Physics very easy especially the calculation aspect. I solved Physics calculation always. I found practical Physic very difficult. I read Physics always even more than any other subjects did. We had only a multipurpose laboratory, which was not well equipped.

We were not exposed to physics practical. In fact, we did it just twice in a whole session.

A female student stated that she created fear only in the practical aspect of Physics. Male student were better than female students in Physics in my school were. The teaching style of my Physics teacher was good. My Physics teacher always tried his best to impart knowledge in the students.

A female student wanted to continue a career in Physics in future. She intended to study engineering in future

4.6.7. FOCUS GROUP INTERVIEW FOR BOYS IN SCHOOL 004 (RURAL)

Science as a subject, Physics is very interesting. Physics was not a difficult subject to me because for every question or for any calculation, a formula would be attached to it in order to get the answers.

As a Physics student, I solved calculations in Physics every time because Physics calculations could only be solved using many formulae.

The theory aspect of Physics was so difficult for me because whenever our Physics teacher gave examples in the class, most of the time the question given to us in the example would not appear in the theory, that was why I found it difficult to cope with.

I read Physics most of the time on my own. We only had a multipurpose laboratory that was not well equipped.

We were not well exposed to Physics practical in our school. We normally had it once in every week. As a student, I did not create unnecessary fear for Physics because our Physics teacher happened to be an experienced teacher who created more time to explain Physics to us.

Female students were better than male students in my school were because in my class male students used to make noise during Physics class. Whenever teaching and learning were in progress, they would not concentrate but the female students paid more attention to our Physics teacher.

Our physics teacher always ensured that the students remained focused in the class. His intelligence and knowledge impartation to students had greatly helped in no small measure. A male student intended to study discipline related to Physics in future because he wanted to study engineering.

4.6.8. FOCUS GROUP INTERVIEW FOR GIRLS IN SCHOOL 004 (RURAL)

Physics is an interesting subject although most students find it difficult. As a serious student, I found Physics so easy and very interesting. I practiced Physics calculation every day. Once the physics teacher taught us any topic, when I got home, I solved calculation Physics so that I could understand it better.

As a Physics student, I found the Practical aspect so difficult because I could easily make mistake in it. I read it regularly before the next lesson. Our Physics laboratory was multipurpose and not well equipped. We were not really exposed to Physics practical in our school because we did not have adequate materials for the Physics practical.

I did not usually create unnecessary fear because once the teacher was teaching us in the class I made sure I listened to him in order to understand his lesson so as not to create unnecessary fear during examination time.

In my school, female students were better than male students were because female students asked questions in the class more often than the male students did. Female students were also serious in the class.

Our Physics teacher being an experienced one was very good and his teaching was superb. I had the intention to continue with discipline related to Physics in future since my course of study in the university will require Physics.

4.6.9. Discussion and findings

In the focus group interviews conducted separately for male and female students in the selected schools, the major emphasis was to know how boys and girls perform in Physics. Based on the data collected, it was deduced that male students performed better than female students did because they loved attempting calculations in Physics. That really showed that they had more interest in Physics than the female students did.

Male students were always actively involved in class activity. They asked questions most of the time and they did assignments on time. Their active participation in practical class also helped them to perform better than the female students in Physics.

Male students do not create unnecessary fear for Physics. They like both theory and practical work. The female students used to contact the male students frequently to solve calculation in Physics together.

4.7. Document Analysis

Table 4.13: Analysis of West African Senior Secondary Certificate Examination (WASSCE)

Results in Physics obtained from the selected schools from Year 2011-2015

SCHOOL NAMES	YEAR	NO. OF CREDIT & ABOVE		NO OF PASSES		NO OF FAILURE		% CREDIT & ABOVE		NO OF PASSES		NO OF FAILURE	
		M	F	M	F	M	F	M	F	M	F	M	F
St, Michaels' catholic school total	2001	25	15	0	0	0	0	61	39	0	0	0	0
	2012	32	26	3	5	0	0	48	39	5	8	0	0
	2013	26	17	16	20	10	7	27	18	17	21	10	7
	2014	2	1	18	16	21	31	2	1	20	18	24	35
	2015	2	0	15	11	9	19	4	0	27	20	16	34
TOTAL	348	87	60	52	52	40	57	25	15	15	15	11	16
Akure Muslim college		11	10	5	0	0	0	42	38	19	0	0	0
	2012	6	5	6	3	1	0	29	24	29	14	5	0
	2013	0	0	1	5	11	16	0	0	3	15	33	48
	2014	2	1	6	5	7	4	8	4	24	20	28	16
	2015	1	0	0	2	0	0	33	0	0	67	0	0
TOTAL	108	20	16	18	15	19	20	19	15	17	14	18	19
Ogbe high school	2011	0	0	3	1	20	10	0	0	9	3	59	29
	2012	1	0	2	1	0	0	25	0	50	25	0	0
	2013	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0	0	2	0	6	2	0	0	20	0	60	20
	2015	0	0	0	1	0	0	0	0	0	100	0	0
TOTAL	49	1	0	7	3	26	12	2	0	14	14	53	24
Aponmu community high school	2011	0	0	2	4	5	0	0	0	18	36	45	0
	2012	17	10	0	1	0	0	61	36	0	4	0	0
	2013	0	0	0	1	0	0	0	0	0	100	0	0
	2014	10	9	0	0	0	0	53	47	0	0	0	0
	2015	1	1	3	0	0	0	20	20	60	0	0	0
TOTAL	64	28	20	5	6	5	0	44	31	8	9	8	0

4.7.1. DISCUSSION AND FINDINGS

In St Michael's Catholic High school, school 001 (urban) out of 348 students who wrote West African examination council (WAEC) exams for the stipulated years, 179 male students and 169 female students registered for Physics. In Akure Muslim College, school 002 (urban), out of 108 students, 57 male students and 51 female students registered for Physics respectively. In Ogbe High school, school 003 (rural), out of the 49 students who registered for Physics only 34 were male students while 15 were female students. In Aponmu community High School, school 004 (rural), out of 64 students who registered for Physics, 38 were male students while only 26 female registered for the examination. From document obtained from the schools selected, it was observed that the enrolment of male students in Physics was more than that of the female students in both urban and rural school from 2011- 2015. This is in line with the study by Iwu (2017) which discovered that the number of females who study Physics in secondary and tertiary institutions is small compared to the number of boys. In addition, Mbajorgu (2003) opined that female enrolment in Physics and science subjects in general is very poor.

The academic performance of urban students in Physics, who had credit passes and above was higher than those in the rural schools were. Most students in the rural areas had more passes than those in urban areas. For meaningful academic performance, the credit passes and above in Physics would be used as a requirement for admission into higher institution of learning. The urban areas performed better than the rural area. This is in line with Owoeye (2002) & Onah (2011), which in their separate studies, indicated that schools in urban areas achieved more than schools in the rural areas in science subjects.

In school 001 (urban), 25% male students out of 348 who registered for Physics, passed Physics at credit, while only 17% represented the female

students. In school 002 (urban), out of the 108 students only 19% male students passed Physics at credit level while 15% represented the female students. In school 003 (rural), out of 49 students who registered for Physics, 2% male students passed Physics at credit level while no female students passed physics at credit level in those years. In school 004 (rural), 64 students registered for Physics with 44% male students passing Physics at credit level and 31% female students also passed Physics. Based on this analysis, male students performed better than female students in Physics from 2011- 2015. This result agrees with the finding of Shiaki (2005) that males scored higher than the females in the confidence learning scale supporting evidence that males tend to be more confident than females.

4.8. SUMMARY

The data collected from the interviews indicated that the location of students influences the academic performance of students in physics. Students in urban areas have adequate resources for teaching and learning. They had well equipped laboratories and functional libraries in place. Whereas in rural areas the laboratories and libraries were not adequately equipped. Lack of these essential facilities could adversely affect students' academic performance in physics. In addition, the data obtained from interviews also revealed that male students performed better than female students in physics due to their active participation in class activities. Only few female students showed keen interest in physics due to unnecessary fear for calculations and practical. The study revealed that there are barriers to female students' participation in physics these are: some parents considered it wasteful to allow their girls to offer science since they know they will soon end up in their husband's houses.

CHAPTER 5

5. Introduction

This chapter discusses the answers to the research questions, summary of the findings, the contributions of the study, its shortcomings and recommendations.

5.1. Research questions

The study revealed exploring how location and gender influence the performance of students in Physics a case study of Akure South Local Government Area, Ondo State, Nigeria. The aim of this study was to examine the nature of location on the level of Physics performance of the students and to investigate the nature of gender on the students' performance on Physics. In order to achieve the purpose of the study, the following research questions guided this research work:

- What is the nature of the influence of location on the performance of physics students?
- How do girls and boys perform in physics?

5.1.1. What is the nature of the influence of location on the performance of physics students?

A. Case 1 (Mr. John)

The study revealed that Mr. John was an experienced and competent physics teacher in an urban area. His teaching methodology was superb. The introduction of prior knowledge in his teaching made his students to understand physics very well. The teaching of Mr. John was learner centered, which was revealed by the interaction between him and his students. Mr. John utilized demonstration and illustrative methods during classroom teaching. These greatly enhanced effective teaching thereby promoting students' better academic performance. The interview conducted revealed that Mr. John's school, being an urban one, had a multipurpose laboratory that was well equipped. Not only that, his school had a standard, well-equipped library for students to read where they had

access to materials that would update their knowledge. Students also had access to internet facilities. When all these facilities are put in place, students understanding and academic performance would be adequately enhanced.

B. Case 2 (Ms. Jones)

This study showed that Ms Jones classroom teaching was well explanatory. Students acquired more knowledge when a teacher explains a particular topic thoroughly. This will go a long way to improve the students' academic performance. The teacher imbibed demonstration and illustrative methods during the classroom teaching. The students paid rapt attention to the topic because is not taught in abstract. Students comprehend more when they see things than, when only explanation is given. Ms Jones contextual knowledge was superb. She made use of relevant resources to demonstrate reflection and even refraction as infused into the lesson to her students. The aims and objectives of the teaching were achieved. During the interview, it is gathered that Ms Jones had been teaching Physics for the past twenty-eight years.

The years of experience have greatly enabled her to impart knowledge adequately to the students. The classroom teaching reflected her experience in the proper usage of resources in the teaching and learning activities. According to her, the environment being urban had been fair for teaching and learning. The Students were exposed to Physics practical once there was practical work in the theory to do. The school, being an urban school, had enough equipment; as a result, students are exposed to practical work. The practical aspect of Physics in conjunction with theory enabled the students to perform well in both internal and external examinations. Ms Jones was of the opinion that students in urban areas performed better than those in the rural areas in Physics were because necessary or relevant equipment were readily provided to teach the students and they were frequently exposed to practical more than the students in the rural were.

C. Case 3 (Mr. Clement)

Mr. Clement ensured that the students settled down before the commencement of the lesson this adversely affected the time allotted for the lesson because part of the time was used in settling the students down. He eventually spent little time in teaching the topic. This should be discouraged because there is no way by which the lesson could be effectively carried out. The teacher, often times, rushed over the lesson without achieving the aims and objectives of the lesson. The topic taught was on measurement. The teacher started by asking the students to define atoms but none of them could define it. Mr. Clément's prior knowledge of the topic is incoherent, inadequate and may create misconceptions that could thwart the comprehension of the information. He would have said we take measurements in our day-to-day activities. If you want to measure length, you make use of a ruler or tape ruler.

Those students are familiar with those things. When students' prior knowledge of the topic is brought into limelight, they understand the topic better. Mr. Clements' lesson was not well planned, which really hampered the students' understanding of the topic. When the aims and objectives of classroom teaching are not achieved, the cumulative effect is poor academic performance of students. The teacher's answer to a student's question was full of misconception. Simple explanation would have been used for the student to understand better. A student asked a question about the difference between a long ruler and a short ruler. The Physics teacher told the students that during inter house sport competition a long ruler can be made use of, which is for measurement of 100m and 200m. Carpenter, tailors, can use the short ruler and so on. This is misconception on the part of the teacher. The teacher could have said, 'short rulers are used for short distance measurements while long rulers are used for long distance measurements'. The use of long ruler for long distance measurement could be cumbersome. A long tape ruler can be used effectively for long distance measurement. In terms of evaluation, the

stated aims and objectives of the lesson was not achieved. Students found it difficult to answer the questions being asked by their teacher at the end of the class activity. Effective teaching goes a long way in enhancing students' academic performance.

During the teaching and learning activities, no resources were observed throughout the lesson. The students were not given any materials to observe. When there is non-availability of resources, the topic becomes abstract to the students and this would not enable them to comprehend easily. Based on the interview conducted, Mr. Clement mentioned that location could adversely affect students' academic performance, not only in Physics but in other subjects too. The students in the urban areas performed better than those, in the rural areas due to access to internet and purchase of textbooks. Parents of students in the urban areas are more enlightened and they want the best for their ward. Schools in urban areas also have well equipped libraries for students. The laboratories in urban areas have adequate apparatus for Physics practical. Location really helps those in urban areas than rural. The adequate facilities in place really pave way for the students to perform better than those in the rural areas.

Case 4 (Mr. Patrick)

Mr. Patrick classroom was spacious and very neat except that the ceilings were broken which made the class very hot in the afternoon. The Physics class was not conducive at all. So many students lumped up in the classroom. During the classroom teaching, it was observed that the class was very hot. The lesson should have been done before break time or immediately after break time. This would have enabled the students to participate well in the class. Based on the interview conducted, Mr. Patrick had been teaching Physics for the past fifteen (15) years. The school being a rural school had only one laboratory that was not well equipped.

Lack of or inadequate apparatus is one of the main causes of poor performance of students in the rural areas.

Mr. Patrick was of the opinion that location of his school had really affected the academic performance of students in Physics. Most students used to come late at times to school. Their lateness to school always affected them, as much of the class work would have been done before their arrival. Students that form the habit of coming late to school, always have low academic performance compared to those that come to school early. Students in urban areas performed better than those in the rural areas because of necessary facilities put in place

5.1.2. How do girls and boys perform in physics?

A. Case 1 (Mr. John)

Mr. John opined that gender is a disposing factor in the choice of Physics in secondary school. The Male students offer Physics more than female students. The males are more science oriented than female. In African settings, there is always preference of males; this encourages males to perform better at the expense of the females. Male students have interest more than the female students do in Physics. They always pay rapt attention to the lesson and actively involved in class activities. They asked questions and they participated in Physics practical.

B. Case 2 (Ms. Jones)

Ms. Jones was of the opinion that the case of gender should not cause a barrier in studying physics but at times female students ran away from physics because of the Mathematic inside because the language of Physics is Mathematics. Therefore, if that should be the case, females could run away from Physics but such attitude was not expected. In African settings, there is always preference for males, that once you are a boy or a male child, it is you that will carry the name of the family forward they will now want their names to be heard all over the world. They will now encourage such to offer subject that will be of good advantage to the

community or their own family. Looking at the population of this school the boys had more interest in Physics than the girls. Based on Ms Jones teaching experience over the years, the male students performed better than the female students in this school did. The rate of performance is 75:25

C. Case 3 (Mr. Clement)

Mr. Clement opined that gender was a disposing factor in the choice of Physics in secondary school. According to him, one noticed that female students fear Physics more than the male students based on this locality do do. He was in support of the view that male students are more science oriented than female students are. Most female students fear Physics because of the calculations involved. Most girls dislike Mathematics related subjects. Male students had interest in Physics more than the female students did. This was evident in the class when students were asked questions. The boys always asked questions more and did assignment promptly. Based on Mr. Clement teaching experience over the years, the rate of performance of male students was higher than that of female students in his school. There had been excellent academic performance on the part of the male students.

D. Case 4 (Mr. Patrick)

Mr. Patrick agreed that male students are more science oriented than female students are. The male students exhibit more concentration than the female students do. Mr. Patrick supported that in African settings, preference for males had been on the increase. More concentration and attention were given to male children believing that if they had problems along the way, their education would continue unlike the female children who could be impregnated along the way and their education would stop abruptly. Male students had more interest in physics than the female students did. Male students could do any form of practical.

The male students showed active participation in the class and did assignments promptly unlike the female students. This helped to perform

better than the female students did. Mr. Patrick mentioned that in his present school, male students performed better than female students did. The focus Group interviews. These also answer the research question “How do girls and boys perform in physics? The focus group interviews conducted for students in the selected schools revealed that male students performed better than female students in Physics did because they had courage of working Physics and they exhibited no fear in working Physics. The data collected revealed that male students were better than female students in Physics were. Stressing that most male students were more responsible than the female students were. Male students were always eager to know more unlike female students. The male students were better in every aspect in physics. They cultivated the habit of reading Physics always.

5.2. Document analysis

Based on the academic records of West African Secondary School Certificate Examination (WASSCE) results from 2011 to 2015 collected from the principals of the selected schools for the purpose of this study, was to ascertain the level of students’ academic performance in Physics. From document obtained from the schools selected, it was observed that the enrolment of male students in Physics was more than that of the female students in both urban and rural school from 2011- 2015. The academic performance of urban students in Physics, who had credit passes and above, was higher than those in the rural schools. Therefore, urban students performed better in physics than the rural students. Based on the document analysis, male students performed better than female students in Physics from 2011- 2015 did.

5.3. Summary of findings

In this study, the investigations of how location and gender influence the performance of students in Physics were examined. Some barriers to efficiency and effectiveness of the students’ performance in Physics were

also revealed. These obstacles include lack of facilities in the rural areas, lack of competent teachers and lack of interest in the students towards Physics. All these are done to enable the offering of meaningful suggestions to the identified problems. The information gathered was through interviews, classroom observations and documents obtained from the schools that participated in the study.

The information and data collected were qualitatively analyzed and the following findings were made:

Firstly, the urban students perform better in Physics than the rural students owing to the fact that they have competent and experienced teachers and there were various facilities in place which facilitated learning of Physics in that locality. Another fact is that the urban environment is more conducive to learning than the rural environment.

Secondly, the male students perform better than female students in Physics do. The gender of the students affects their performance; as a result, most of the female students always show lack of interest in Physics. The male students are confronted with the task of analyzing questions in Physics, which most females do not like because they feel more comfortable with subjects that require less practical application.

Lastly, the male students in rural areas perform better compared to female students in Physics due to the level of achievement motivation, which is higher for boys than that of girls. In the rural areas, most parents believe that boys are the future heads of their homes while the girls should be wholly concerned with home keeping. This accounts for the higher level of achievement motivation for boys than that of girls.

5.4. Main contributions of the study focus on gender and location.

The above result and findings reveal that students in urban areas perform better compared to students in rural areas in Physics. The results also

show that the gender of the students affect their performance in Physics and the male students always perform better compared the female students in Physics both in the rural and urban areas. Conclusion are then be drawn that the implication of the present study is useful with regard to the distribution of amenities to various towns and communities by the government and the developments of the interest of female students in Physics.

5.5. Shortcomings of the study

Findings of the study are based, on four schools in Akure South Local Government Area, Ondo State, Nigeria: in which four teachers participated in the interviews and classroom observations. It is interesting to envisage what the findings would have been if the study had been extended to other local governments within the state for teachers and learners who shared the same perception. However, the participants in this study fulfilled the requirements of the research design and criteria.

5.6. Recommendations

The following are the recommendations of the study, comprising suggestions firstly for the relevant stakeholders and secondly for further research. Government should ensure that there is equal distribution of amenities in the rural and urban areas and the teacher teaching in the rural areas should be compensated adequately, salary wise. Government should also send education supervisors to school, to make sure that the financial aids and amenities are properly utilized. In addition, government and curriculum planners should see to increasing the rate of educational and vocational areas that involve females. The teachers in the rural areas must be involved in developing curricula because they need to relate curricula to the immediate situation, means that much of the development work must take place at local level. They should be encouraged to attend lectures, symposia and workshop that could broaden their knowledge in modern method of teaching Physics. The practice of continuous assessment should be encouraged in schools so that teachers can

effectively monitor the achievement of their female students with a view to knowing their weak areas in Physics. The study showed that there were some deficiencies in the subject matter knowledge of the lessons. In-service teacher training must be provided with emphasis on the interactions and classroom discourse.

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Ondo State/ Akure South public secondary schools WASSCE registration from 2010 to 2015 source: ODMOE/PR&S/R&S/EMIS 08/12/2016

APPENDICES

APPENDIX 1: INTERVIEW GUIDE

What is the nature of the influence of location on the performance of physics students?

1. For how long have you been teaching Physics?
2. How conducive is this environment for teaching and learning?
3. Do you have Physics laboratory?
4. How equipped is your Physics laboratory?
5. How often do you expose students to physics practical?
6. Do you give students take home assignments?
7. How often do you mark the assignments?
8. How frequent do you make use of instructional materials for teaching of Physics?
9. In case of non availability of instructional materials, what would you do to achieve effective teaching?
10. What can you say about the performance of Physics students based on this environment?
11. In your own view, how would you rate the performance of your students in Physics?
12. Does location of school has influence in academic performance of students in Physics?
13. Do you agree that students in rural areas perform better than students in urban areas?
14. What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?

How do girls and boys perform in physics?

15. Is gender a disposing factor in the choice of physics in secondary school?
If yes why?
16. It is often said that “males are more science oriented than females”, would you agree to this statement?

17. Does family background have influence on students' academic performance in Physics? If yes, how?
18. In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?
19. Based on your environment, which of the gender do you think has interest in Physics more and why?
20. Based on your teaching experience over the years, rate the performance of male students and female students in your school?
21. How do you treat boys and girls offering Physics in your school? Any preference for any of the gender?
22. Can preference for the gender of teacher enhance academic performance of students in Physics? How?

APPENDIX 2: OBSERVATION GUIDE

The researcher based on the following parameters will observe teachers in the selected schools:

LESSON PREPARATION:

.....
.....

METHODOLOGY/APPROACH:

.....
.....

TEACHER KNOWLEDGE (CONTENT, CONTEXT, LEARNERS)

.....
.....

CONTENT KNOWLEDGE:

.....
.....

CONTEXT KNOWLEDGE:

.....
.....

INTERACTION WITH LEARNERS:

.....
.....

TYPES OF ACTIVITIES USED:

.....
.....

USE OF RESOURCES:

.....
.....

APPENDIX 3: LETTER TO PHYSICS TEACHERS

Dear Ma/Sir

REQUEST: PHYSICS TEACHER TO PARTICIPATE IN AN INTERVIEW

This letter is an invitation to consider participating in a study, I, **Oluseye Folasayo Sadare** am conducting, as part of my research as a Master's student at the University of South Africa, entitled "Exploring how **location and gender influence the performance of students in Physics** (A Case Study of Akure South Local Government Area, Ondo State, Nigeria)". Permission for the study has been given by the school University of South Africa and the Ethics Committee of the College of Education, UNISA. I have, purposefully, identified you as a possible participant because of your valuable experience and expertise as related to my research topic.

I would like to provide you with more information about this project and what your involvement would entail if you should agree to take part. The importance of location and gender in education is substantial and well documented. In this interview I would like to have your views and opinions on this topic. This information can be used to improve the infrastructures provided by governments and the attitudes of science teachers towards their transfer to rural and urban secondary schools

Your participation in this study is voluntary. It will involve an interview of approximately 15minutes in length to take place in a mutually agreed upon location at a time convenient to you. You may decline to answer any of the interview questions if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences.

With your kind permission, the interview will be audio-recorded to facilitate collection of accurate information and later transcribed for analysis. Shortly after the transcription has been completed, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. All information you provide is considered completely confidential. Your name will not appear in any publication resulting

from this study and any identifying information will be omitted from the report. However, with your permission, anonymous quotations may be used. Data collected during this study will be retained on a password protected computer for twelve months in my locked office. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at St Michael Catholic high school, Akure (+2348035825812) or by email at sadareoluseye@gmail.com.

I look forward to speaking with you and thank you very much, in advance, for your assistance in this project. If you accept my invitation to participate, I will request you to sign the consent form, which follows.

Yours sincerely

.....

CONSENT FORM

I have read the information presented in the information letter about the study on Exploring how location and gender influence the performance of students' in Physics (A case study of Akure South local government area, Ondo state, Nigeria). I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted. I am aware that I have the option of allowing my interview to be audio recorded to ensure an accurate recording of my responses. I am also aware that excerpts from the interview may be included in publications to come from this research, with the understanding that the quotations will be anonymous. I was informed that I may withdraw my consent at any time without penalty by advising the researcher. With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

Participant Name : _____
Participant Signature: _____
Researcher Name: _____

Date

Researcher Signature:

Date:

APPENDIX 4:
A LETTER REQUESTING PERMISSION FROM THE PRINCIPAL TO
CONDUCT RESEARCH

DATE:

Title of study: Exploring how Location and Gender influence the Performance of Students in Physics (A Case Study of Akure South Local Government Area, Ondo State, Nigeria).

.....
.....
.....

Dear Sir,

I, **Oluseye Folasayo Sadare** am doing research with Prof Awelani Mudau, a professor in the Department of Science and Technology Education towards a Master's degree in Education (M Ed) at the University of South Africa. We are inviting you to participate in a study entitled "Exploring how location and gender influence the Performance of Students in Physics in Akure South Local Government Area, Ondo State, Nigeria. The aim of the study is to reveal the influence of location and gender on senior secondary school students' performance and attitude in Physics in Akure south local government area, Ondo state, Nigeria.

Your institution has been selected because of their location in the Akure South Local government area of the state and the researcher would like to know how gender and location influence the learning of Physics subject.

The study will entail interviewing the teachers to understand how the students perform during Physics class based on their gender and how well the school is equipped based on location. Questionnaires will also be administered to the students to know their views about Physics subject and how the location of their school affects their learning Physics

The benefits of this study are many. This study will help the teachers, parents and stakeholders to have cleared understanding of the nature of gender and location to learning of science subjects especially Physics.

Potential risk is of discomfort, but there are appropriate steps that will be taken to mitigate or reduce the overall risk. This research will not cause severe risk or negative physical, emotional, social, cultural or political consequences to the participants

Feedback procedure will entail contacting the researcher if you would like to be informed of the final research findings. Please contact Oluseye Folasayo Sadare on +2348035825812.

Yours sincerely

.....
Oluseye F. Sadare

APPENDIX 5

LETTER REQUESTING PERMISSION FROM THE PRINCIPAL TO CONDUCT RESEARCH

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT FEW SELECTED SECONDARY SCHOOLS IN
AKURE SOUTH LOCAL GOVERNMENT AREA ONDO STATE NIGERIA.

28th November, 2016


Title of study: Investigating the nature of Location and Gender on the performance of students' in
Physics (A case study of Akure South Local Government Area, Ondo State, Nigeria).

The Chairman
Akure South Local Government Area
Akure, Ondo state, Nigeria

Dear Sir

I, Oluseye Folasayo Sadare am doing research with Prof. A.V Mudau, a professor in the Department of Science and Technology Education towards a Master's degree in Education (M Ed.) at the University of South Africa. We are inviting you to participate in a study entitled "Investigating the nature of location and gender on the performance of students' in Physics (A case study of Akure South local government area, Ondo State Nigeria)". The aim of the study is to reveal the nature of location and gender on senior secondary school students' performance and attitude in Physics in Akure local government area, Ondo state, Nigeria. Akure South local government area, Akure Ondo state, Nigeria has been selected because some school are selected in the local government to conduct a research on the impact of location and gender on the performance of students' in Physics. This will enable the researcher to gather the data that will help him in his investigation. This study will entail the collection of data from few selected school in the urban and rural settings of Akure south local government area of Ondo state. Questionnaires will be administered to the students and teachers and selected teachers will be interviewed. The study will enable the researcher, parents and stake holders to know the impact of gender and location on the academic performance of students' in Physics subject in the local government. There is absolutely no risk in the conduct of the research. Timely feedback will be provided to the participant shortly after the research analysis is done. The participant may contact the researcher on the contact details that will be given. The findings can also be checked online after a period of time. The outcome of this will be of immense contribution to the development of educational sector in Nigeria and most especially Ondo state, giving clearer understanding of the nature of gender (male or female) and location (Urban or rural) on the academic performance and attitude of students in physics .

Yours sincerely


Oluseye F. Sadare
Class teacher



APPENDIX 6:

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT FEW SELECTED SCHOOLS IN AKURE SOUTH LOCAL GOVERNMENT AREA, ONDO STATE, NIGERIA

Dear Sir

I, **Oluseye Folasayo Sadare**, am doing research with Prof. A.V Mudau, a professor in the Department of Science and Technology Education towards a Master's degree in Education (M Ed.) at the University of South Africa. We are inviting you to participate in a study entitled "Exploring how location and gender influence the performance of students' in Physics (A case study of Akure South local government area, Ondo State Nigeria)". The aim of the study is to reveal the nature of location and gender on senior secondary school students' performance and attitude in Physics in Akure south local government area, Ondo state, Nigeria. Akure South local government area, Akure, Ondo state, Nigeria has been selected because some school are selected in the local government to conduct a research on the impact of location and gender on the performance of students' in Physics. This will enable the researcher to gather the data that will help him in his investigation. This study will entail the collection of data from few selected school in the urban and rural settings of Akure south local government area of Ondo state. Questionnaires will be administered to the students and teachers and selected teachers will be interviewed. The study will enable the researcher, parents and stakeholders to know the impact of gender and location on the academic performance of students' in Physics subject in the local government. There is absolutely no risk in the conduct of the research. Timely feedback will be provided to the participant shortly after the research analysis is done. The participant may contact the researcher on the contact details that will be given. The findings can also be checked online after a period. The outcome of this will be of immense contribution to the development of educational sector in Nigeria and most especially Ondo state, giving clearer understanding of the nature of gender (male or female) and location (Urban or rural) on the academic performance and attitude of students in physics .

Yours sincerely

.....
Oluseye F. Sadare

APPENDIX 7:
REQUEST FOR PERMISSION TO USE WEST AFRICAN SENIOR
SECONDARY SCHOOL CERTIFICATE EXAMINATION RESULT FROM
ONDO STATE MINISTRY OF EDUCATION

REQUEST FOR PERMISSION TO USE WEST AFRICAN SENIOR SECONDARY SCHOOL CERTIFICATE
EXAMINATION RESULT FROM ONDO STATE MINISTRY OF EDUCATION

28th November, 2016


Title of study: Investigating the nature of Location and Gender on the performance of students' in
Physics (A case study of Akure South Local Government Area, Ondo State, Nigeria).

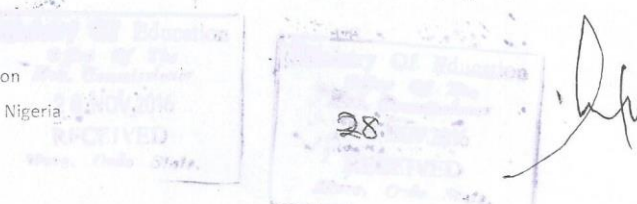
The Commissioner
Ministry of Education
Akure, Ondo state, Nigeria

Dear Sir

I, Oluseye Folasayo Sadare am doing research with Prof. A.V Mudau, a professor in the Department
of Science and Technology Education towards a Master's degree in Education (M Ed.) at the
University of South Africa. We are inviting you to participate in a study entitled "Investigating the
nature of location and gender on the performance of students' in Physics (A case study of Akure
South local government area, Ondo State Nigeria)". The aim of the study is to reveal the nature of
location and gender on senior secondary school students' performance and attitude in Physics in
Akure local government area, Ondo state, Nigeria. I hereby write to request for permission to obtain
statistical data of the number of students who registered for WASSEC in Ondo state between
2009/2010 to 2014/2015. Also the academic record of students' performance in Physics from
2009/2010 to 2014/2015 in Akure south local government area of Ondo state to assist me in my
investigation is required. This will enable the researcher to gather the data that will help him in his
investigation. The study will entail the collection of data from few selected school in the urban and
rural settings of Akure south local government area of Ondo state. The study will enable the
researcher, parents and stake holders to know the impact of gender and location on the academic
performance of students' in Physics subject in their local government. There is absolutely no risk in
the conduct of the research. The feedback will entail contacting the researcher if you would like to
be informed of the final research findings. Please contact Oluseye Folasayo Sadare on
+2348035825812.

Yours sincerely


Oluseye F. Sadare
Class teacher



APPENDIX 8:

LETTER OF APPROVAL FROM MINISTRY OF EDUCATION



MINISTRY OF EDUCATION
AKURE, ONDO STATE OF NIGERIA

PLANNING, RESEARCH AND STATISTICS DEPARTMENT

28th Dec., 2016

THE PRINCIPAL,

1. ST. MICHAEL'S CATHOLIC HIGH SCHOOL, AKURE;
2. AKURE MUSLIM COLLEGE, AKURE;
3. IJO-MIMO OLUWA HIGH SCHOOL, AKURE;
4. ALAKUNRE SECONDARY COMP. HIGH SCHOOL, AKURE;
5. OGBE HIGH SCHOOL, ODA;
6. APONMU COMM HIGH SCHOOL. APONMU;
7. ST. FRANCIS HIGH SCHOOL, AKURE;
8. OMOLUOROGBO GRAM. SCHOOL, AKURE;
9. AFRICAN CHURCH COMP. H/S., AKURE.

LETTER OF INTRODUCTION

The bearer: **SADARE OLUSEYE FOLASAYO**, a student of University of South Africa, a Masters Degree Student in the department of Science and Technology Education under the supervision of Prof. A. V. Mudau, is authorized to visit the above listed schools in Akure South Local Government of Ondo State on data gathering.

Please accord him the necessary assistance.

Thank you.

Adetona J.A.

For: Director (PR&S)

APPENDIX 9: ETHICS LETTER



COLLEGE OF EDUCATION RESEARCH ETHICS REVIEW COMMITTEE

19 October 2016

Ref : 2016/10/19/55750974/49/MC

Student : Mr OF Sadare

Student Number : 55750974

Dear Mr Sadare

Decision: Approved

Researcher: Mr OF Sadare
Tel: +2784 361 8562
Email: Sadareoluseye@gmail.com

Supervisor: Prof. AV Mudau
College of Education
Department of Science and Technology of Education
Tel: +2712 4296353
Email: mudauav@unisa.ac.za

Proposal: The impact of location and gender on the academic performance of students in Physics in Akure South Local Government area, Ondo State, Nigeria

Qualification: M Ed in Natural Science Education

Thank you for the application for research ethics clearance by the College of Education Research Ethics Review Committee for the above mentioned research. Final approval is granted for the duration of the research.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the College of Education Research Ethics Review Committee on 19 October 2016.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
 - 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the College of Education Ethics Review Committee.*
- An amended application could be requested if there are substantial changes from the*



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existing proposal, especially if those changes affect any of the study-related risks for the research participants.

- 3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

Note:

The reference number 2016/10/19/55750974/49/MC should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the College of Education RERC.

Kind regards,



Dr M Classsens
CHAIRPERSON: CEDU RERC
mcdtc@netactive.co.za



Prof VI McKay
EXECUTIVE DEAN



University of South Africa
Pretter Street, Muckleneuk Ridge, City of Tloane
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APPENDIX 10:

INTERVIEW TRANSCRIPT OF MR. JOHN

INTERVIEW TRANSCRIPT OF MR JOHN SEPTEMBER 2017 AT ST MICHAEL'S CATHOLIC HIGH SCHOOL

Researcher (R): Respondent (T)

- R: I really thank you for the opportunity giving me to interview you this day
- R: For how long have you been teaching Physics?
- T: I have been teaching physics for the past sixteen (16) years
- R: How conducive is this environment for teaching and learning?
- T: The environment is well conducive for teaching and learning
- R: Do you have Physics laboratory
- T: Yes, but it is multipurpose
- R: How equipped is your Physics laboratory?
- T: The laboratory is well equipped
- R: How often do you expose students to physics practical?
- T: I always expose them to physics practical after teaching the topic
- R: Do you give students take home assignments?
- T: Yes
- R: How often do you mark the assignments?
- T: I always mark the assignment as at when due
- R: How frequent do you make use of instructional materials for teaching of Physics?
- T: Very frequent
- R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?
- T: I improvise in case of non-availability of materials
- R: What can you say about the performance of Physics students based on this environment?
- T: They perform excellently
- R: In your own view, how would you rate the performance of your students in Physics?
- T: 85%, excellent performance
- R: Is location of school has influence in academic performance of students in Physics?
- T: Yes. Because they are in urban areas they have adequate apparatus. They have well equipped library and they have access to internet facilities
- R: Do you agree that students in rural areas perform better than students in urban areas?

- T: No. Students in urban areas perform better than those in rural areas.
- R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?
- T: I teach students well. I ensure that they are given assignments, mark the assignments and motivate the students
- R: Is gender a disposing factor in the choice of physics in secondary school? If yes why?
- T: Yes. Male students offer physics more than female students
- R: It is often said that “males are more science oriented than females” would you agree to this statement
- T: As I have said earlier, males are more science oriented than female
- R: Does family background have influence on students’ academic performance in Physics? If yes, how?
- T: Yes learned parents would always want the best for their children by so doing, they buy textbooks for them, encourage them and put them in extra mural lesson
- R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?
- T: Preference for males will only encourage males to perform better at the expense of the females
- R: Based on your environment, which of the gender do you think has interest in Physics more and why?
- T: Males. They are always active in the class. They ask questions and they are actively involved in physics practical
- R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?
- T: 85%, excellent performance
- R: How do you treat boys and girls offering Physics in your school? Is there any preference for ANY of the gender?
- T: I treat them equally. No preference for any of the gender in order to avoid hatred for the teacher and the subject.

APPENDIX 11:
INTERVIEW TRANSCRIPT OF MS. JONES

**INTERVIEW TRANSCRIPT OF MRS JONES SEPTEMBER 2017 AT AKURE
MUSLIM COLLEGE, AKURE**

Researcher: R Respondent: T

- R: For how long have you been teaching Physics?
T: For the past 28 years
R: How conducive is this environment for teaching and learning?
T: The environment has been fair
R: Do you have Physics laboratory
T: We have a mini not up to a standard laboratory
R: How equipped is your Physics laboratory?
T: We have materials that are really working but nowhere to store them
R: How often do you expose students to physics practical?
T: Once there is practical work in the theory to do, I teach them and I organize for the practical
R: Do you give students take home assignments?
T: Yes I do
R: How often do you mark the assignments?
T: When they submit the work and when am opportune at my leisure time I mark
R: How frequent do you make use of instructional materials for teaching of Physics?
T: I do use them nearly each teaching because you can't teach physics as an abstract subject so the students need to see what you teach them
R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?
T: I do improvise. I use improvised materials
R: What can you say about the performance of Physics students based on this environment?
T: Particularly in my school, their performance has been so fair, they have been cooperating and they have been having good results
R: In your own view, how would you rate the performance of your students in Physics?
T: They are above average
R: Is location of school has influence in academic performance of students in Physics?

- T: The location will not affect. What will affect most is the teacher handling the subject and probably once we are in the city, the location will not have any adverse (negative) effect on the teaching and the performance of the students.
- We don't expect any bad performance once the teachers are the same all over but the students in the rural but majority of them are not keen about education if we have some that have interest, they can perform equally good as people in the urban
- R: Do you agree that students in rural areas perform better than students in urban areas?
- T: We don't expect people in the rural to perform better than the urban areas because in urban, you have necessary or relevant equipment to teach the students and the students are being exposed to practical more than the students in the rural. Likewise, we have apparatus and equipped teacher in the urban than rural.
- R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?
- T: I do encourage them when they are in the junior school that they should face their basic science very well and physics deals with day-to-day activities nearly all things that we made mention that is the topics in physics are the ones you can see when you talk of Archimedes principles, fetching of water, the electricity and so on. What it is things that we can see, so we try as much as possible to make physics real, to be at home with the students
- R: Is gender a disposing factor in the choice of physics in secondary school? If yes, why?
- T: The case of gender shouldn't cause a barrier in studying physics but at times female students run away from physics, it is because of the mathematic inside because the language of physics is mathematics. So, if that should be the case, female can run away but we don't expect such. It should be at equal rate or equal ground. Like boys only or girls only, they do perform offer physics. So, gender should not be a disparity for choice
- R: It is often said that "males are more science oriented than females" would you agree to this statement?
- T: well, I could not agree since am a female teacher. I always encourage the girls to offer sciences. It is not only the boys or men that you see in the world of science. The girls also should perform better in physics and generally in science. So gender disparity should not come in. I encourage girls because I'm a female teacher. I also encourage the boys as well. That once you can have a female teacher teaching you then what stops you taking that subject and performing better.

- R: Does family background have influence on students' academic performance in Physics? If yes, how?
- T: Yes it will affect. Because we have some educated people that want their wards to be a medical doctors, to be an engineers, pilots or this and that. Once they know the importance of this subject they can tell their ward to offer it. But if people don't know anything concerning science or even education at all, anything that comes their way, they tell their child to pick it or tailor them towards that. The family background of such can be changed positively.
- R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?
- T: That is African settings that once you are a boy or a male child, it is you that will carry the name of the family forward they will now want their names to be heard all over the world. They will now encourage such to offer subject that will be of good advantage to the community or their own family.
- R: Based on your environment, which of the gender do you think has interest in Physics more and why?
- T: Looking at the population vis-à-vis the boys. The boys are of 60% the girls 40%
- R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?
- T: We have some girls that know the subject better than the boys. Let say 75:25
- R: How do you treat boys and girls offering Physics in your school? Is there any preference for any of the gender?
- T: I treat them equally once they are students under me and I want them to perform better to make it. No gender disparity.
- R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?
- T: The gender has many effects but I do encourage the two of them because the boys according to education that female will tend towards the males and males will tend towards the female.
If it is a male teacher that is teaching them you will see many female students will offer that particular subject that the male teacher is teaching. If we have some girls that are coming because they have interest in the subject, so the teacher that is teaching. That's why we have girls coming in for science but if not, boys will perform better.

APPENDIX 12:

INTERVIEW TRANSCRIPT OF MR. CLEMENT

INTERVIEW TRANSCRIPT OF MR CLEMENT SEPTEMBER 2017 AT OGBE HIGH SCHOOL, AKURE

Researcher (R) Respondent (T):

- R: For how long have you been teaching Physics?
T: Well, I have been teaching physics for the past 25 years.
R: How conducive is this environment for teaching and learning?
T: The environment is conducive.
R: Do you have Physics laboratory
T: I will say yes. It is multipurpose
R: How equipped is your Physics laboratory?
T: the laboratory is not well equipped
R: How often do you expose students to physics practical?
T: They do practical always
R: Do you give students take home assignments?
T: I give them take home assignment to allow them to learn more
R: How often do you mark the assignments?
T: I mark the assignment the following day
R: How frequent do you make use of instructional materials for teaching of Physics?
T: I use instructional materials always because physics deals with what you can see and when students see things, they understand better.
R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?
T: I improvise anytime instructional materials are not available.
R: What can you say about the performance of Physics students based on this environment?
T: The students perform well
R: In your own view, how would you rate the performance of your students in Physics?
T: 80% performance
R: Does location of school have influence in academic performance of students in Physics?
T: Yes. I will say that location can adversely affect students' academic performance, not only in physics but in other subjects too. The students in the urban areas have access to internet, they buy textbooks always, their parents are more enlightened and they want the best for their ward. They

- also have well equipped libraries for students. In this school, we have no library. The laboratories in urban areas have adequate apparatus for physics practical. Location really helps those in urban areas than rural
- R: Do you agree that students in rural areas perform better than students in urban areas?
- T: It depends. Teachers are the same all over. We have the same qualifications. The problem of not performing well lies with the students and not the teachers. But one expects better performance from urban than rural based on access to information technology.
- R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?
- T: As a physics teacher, I always go to class and teach the students. I encourage the lazy ones to read more. I give them assignments and mark them for them to know their mistakes. I also take them extra teaching to impact adequate knowledge and finish the syllabus for them
- R: Is gender a disposing factor in the choice of physics in secondary school? If, yes why?
- T: Yes. One notice that male students fear physics more than the female students.
- R: It is often said that “males are more science oriented than females” would you agree to this statement?
- T: Yes. I agree with it because most female students fear physics because of the calculations involved. Most girls dislike mathematics related subjects.
- R: Does family background have influence on students’ academic performance in Physics? If yes, how?
- T: family background has influence greatly. One finds out that if students have educated parents, their parents do encourage them to do science especially physics so that they can become medical doctors or engineers in future. The more they encourage them, the more they are actively involved in the subject because they have a career to pursue in future. The uneducated parents may not bother so much about this, just do any course. No motivation at all.
- R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?
- T: It has really affected academic performance. Both male and female students should be encouraged to study physics. Both are important in the society. There should be no gender discrimination.
- R: Based on your environment, which of the gender do you think has interest in Physics more and why?
- T: Male students have interest more than female students. This is noticeable in the class when students are asked questions. The boys always ask questions more and do assignment promptly.

- R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?
- T: 78% performance
- R: How do you treat boys and girls offering Physics in your school? Is there any preference for any of the genders?
- T: I treat them equally. I have no special treatment for any of them. In fact, preferential treatment should be discouraged to enhance effective teaching and learning.
- R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?
- T: Yes. Most students have preference for male teachers to teach physics. They believe that male teachers can handle the science subjects effectively. No wonder you see girls, often times, offering physics because they preferred a male teacher than a female teacher.
- R: Thank you.

APPENDIX 13:

INTERVIEW TRANSCRIPT OF MR. PATRICK

INTERVIEW TRANSCRIPT OF MR PATRICK SEPTEMBER 2017 AT APONMU HIGH SCHOOL

Researcher: (R) Respondent (T)

- R: For how long have you been teaching Physics?
T: For the past fifteen (15 years)
R: How conducive is this environment for teaching and learning?
T: Very conducive
R: Do you have Physics laboratory
T: We have but only one laboratory
R: How equipped is your Physics laboratory?
T: The equipment is partially not really
R: How often do you expose students to physics practical?
T: We expose them to physics practical right from SS1. We have four periods in a week at least two periods are set aside for practical
R: Do you give students take home assignments?
T: Yes I do
R: How often do you mark the assignments?
T: At the end of the last period, the assignment is marked
R: How frequent do you make use of instructional materials for teaching of Physics?
T: Every time we have physics. I bring instructional materials to teach them to explain to them so that they can understand better
R: In case of non-availability of instructional materials, what would you do to achieve effective teaching?
T: We improvise for ourselves
R: What can you say about the performance of Physics students based on this environment?
T: Averagely they are good because of the environment we are
R: In your own view, how would you rate the performance of your students in Physics?
T: Averagely they are good because some students will go to school without eating in the morning. Averagely they are ok
R: Is location of school has influence in academic performance of students in Physics?
T: Yes, it has affected their performance. They do come late at times to school.

- R: Do you agree that students in rural areas perform better than students in urban areas?
- T: Well it depends on the environment at times they dictate to them but here we don't do that
- R: What role do you play as a Physics teacher to enhance better performance of students in Physics based on your locality?
- T: We started from elementary science so that they can understand better because most of them don't understand the word science so we started elementary science
- R: Is gender a disposing factor in the choice of physics in secondary school? If, yes why?
- T: NO
- R: It is often said that "males are more science oriented than females" would you agree to this statement?
- T: Yes, I agree. The male concentrate more than female students
- R: Does family background have influence on students' academic performance in Physics? If yes, how?
- T: Yes, the problem is at times most of them don't have textbooks. Their parents are very local here. They don't buy textbook for them except mathematics and English other subjects, they don't buy it at all
- R: In African settings, there is always preference for males, of what effect is this to academic performance of students in physics?
- T: In Africa they believe that male students don't have problems unlike female. They concentrate on male students even if they have problems the education will continue
- R: Based on your environment, which of the gender do you think has interest in Physics more and why?
- T: Male students. Male students can do any form of practical. They improvise unlike females they prefer to learn fashion designing. But the male students can move on, they can learn computer work, so that in terms of physics it helps them a lot.
- R: Based on your teaching experience over the years, rate the performance of male students and female students in your school?
- T: In my present school now, male students' performance to female students is 70- 30%
- R: How do you treat boys and girls offering Physics in your school? Is there any preference for any of the gender?
- T: We treat them equally. No discrimination.
- R: Can preference for the gender of teacher enhance academic performance of students in Physics? How?
- T: Male teacher moves with the students unlike female counterpart, they are too harsh a little bit. They work together; they rub minds with the students.

APPENDIX 14:

OBSERVATION OF MR. JOHN

OBSERVATION OF MR. JOHN: SEPTEMBER 2017 AT ST MICHAEL'S CATHOLIC HIGH SCHOOL IN THE MULTIPURPOSE LABORATORY

LINE	DESCRIPTION
1	(0-5minutes)
2	The teaching was done in the multipurpose laboratory. Some set of
3	students were performing physics practical on one side of the laboratory.
4	Before the commencement of the lesson, the teacher made frantic efforts
5	to warn the students not to disturb his class and the students promised to
6	comply. The laboratory was spacious with so many charts pasted on the
7	wall. The laboratory was neat and the students settled down for lesson.
8	The teacher introduced the topic to the students by asking them what
9	refraction is. A female student class defined refraction as the bending of
10	light rays when it passes from one medium to another. Mr. John then
11	asked the students to state the two laws of refraction. Another female
12	student stated that the incidence ray, the reflected ray and the normal at
13	the point of incidence all lie at the same plane. The students could not state
14	the second law. So, the teacher stated that the ratio of the sine of angle of
15	incidence to the sine of angle of refraction is constant.
16	(5-35minutes)
17	After the explanation the teacher then wrote the topic on the chalkboard
18	which is refraction through triangular and rectangular prism. The teacher
19	then wrote that light travels with the same speed on a straight line between
20	two points in the same medium. The teacher told the students that one of
21	the properties of light is that light travels on a straight line. He demonstrated
22	this by drawing rectangle ABCD on the chalkboard. The teacher then
23	showed the students where to place the normal on the triangle. He said
24	that each student will be given a rectangular glass block to work with and
25	they will trace the edges and place it on the drawing sheet. The teacher
27	then explained and wrote the terms used in reference to light waves on the

28	chalkboard as follows: incident ray, refracted ray, angle of incidence and
29	angle of refraction. The incident ray is the light ray moving through the air
30	glass boundary. The refracted ray is the path of a ray in the glass medium.
31	Angle of incidence is the angle the incidence ray makes with the normal.
32	Mr. John then asked the students the following questions. (a) State the
33	principle of reversibility. (b) State two laws of refraction. (c) Differentiate
34	between real image and virtual image. (d) Define the following terms (i)
35	angle of incidence (ii) angle of refraction (iii) incident ray (iii) refracted ray.

APPENDIX 15:

OBSERVATION OF MS JONES

OBSERVATION OF MRS. JONES: SEPTEMBER 2017 AT AKURE MUSLIM COLLEGE IN THE MULTIPURPOSE LABORATORY

LINES	DESCRIPTION
1	(0 – 5 minutes)
2	The lesson was taught in the multipurpose laboratory. The
3	laboratory was not spacious but very neat and well ventilated. The
4	students sat down using long benches and tables in the laboratory.
5	Mrs. Jones introduced the lesson of the day to the orderly seated
6	students. She wrote the reflection of light through curved or
7	spherical surfaces as the topic of the lesson. The teacher then
8	began to explain that when we have a concave mirror and an object
9	is placed in front of it, the image is formed on the screen. She
10	demonstrated this by showing the students on the chalkboard. She
11	told the students that the focal length of a concave mirror is positive
12	while that of a convex mirror is negative. She indicated that a real
13	image has real object and real image. That a virtual image is
14	formed at the back of the screen and the focal length is negative.
15	The teacher then gave the students examples on how to calculate
16	the image distance and the image height.
17	(5-39 minutes)
18	Mrs. Jones then introduced another topic. The topic was refraction.
19	She said refraction is the change in the direction of the path of light.
20	The teacher explained that light changes its direction as it strikes
21	the surface of a material and comes in another direction. She
22	demonstrated this by using beaker, pouring water into it and
23	dropping a substance inside the beaker. She told the students that
24	ray of light would enter and the materials would appear to jump up.
25	The material can move from glass to water and from water to glass.
26	She buttressed her point by saying that light passes from one

27	medium to another. It moves from two media but that of reflection
28	we have regular reflection and scattered reflection. The regular is
29	when the surface is smooth or plane. The irregular one is when we
30	have scattered or diffused reflection of light. The change in path
31	now involves two media. The beaker from dense medium to a
32	denser medium. The teacher explained to the students that the
33	speed of light in air is different from the speed of light in water. The
34	density is also different. So, refraction is the change in direction of
35	light from air or water to glass. She then demonstrated this on the
36	drawing sheet. Mrs. Jones traced the outline of the glass block on
37	the drawing sheet; she placed the pins and observed the pins on
38	the glass block. She looked at the search pins. She said refraction
39	is then obtained. The teacher then said that in the law of reflection
40	the angle of incidence is equal to the angle of reflection. The angle
41	of incidence at the point of normal and the angle of reflection at the
42	point of incidence all are in the same plane. Refraction takes place
43	between two media. The ratio of the sine of incidence to the sine of
44	refraction is always constant for a given media. This is called
45	Snell's law
46	$\sin i / \sin r$. refraction is the bending of light ray as it crosses the
47	boundary between two media. Mrs. Jones ended the topic by
48	differentiating between real and apparent depth. She said that real
49	depth is the actual depth while apparent depth is when the
50	substance appears jump up

APPENDIX 16:

OBSERVATION OF MR. CLEMENT: SEPTEMBER 2017 AT OGBE HIGH SCHOOL IN THE CLASSROOM

LINE	DESCRIPTION
1	(0-5minutes)
2	The classroom was very clean. The teacher ensured that the students
3	settled down before the commencement of the lesson this affected the
4	time allotted for the lesson because part of the time was used in
5	settling the students down. The topic taught was on measurement.
6	The teacher started by asking the students what atoms are. He told
7	the students to define atoms but none of them could define it. He then
8	defined atoms as the smallest particles that take place in the chemical
9	reaction. Mr. clement then stated that measurement can be classified
10	into fundamental quantities or fundamental basics or derived units.
11	Fundamental quantities are length, time, mass and electric current.
12	Out of these, time, length and mass are chosen.
13	(6-37 minutes)
14	Derived units are obtained by multiplication, division and by the
15	combination of the two or more fundamental quantities for example,
16	area= length (l) x length (l). The man used his local language to
17	explain to the students that Volume is length (l) x length (l) x length (l).
18	= l ³ . It is a derived unit, power and momentum too. A student helped
19	the teacher to write the note on the chalkboard for students to copy. A
20	student asked a question about the difference between a long ruler
21	and a short ruler. The physics teacher told the students that during
22	inter house sport competition a long ruler can be made use of that is
23	for measurement of 100m and 200m. The short ruler can be used by
24	carpenter, tailors and so on. The teacher then asked the following
25	questions from the students. State three basic system used in science
26	and engineering. The students found it difficult to answer the question
27	until the teacher told them the answer again. He told the students that
28	length, time and mass are the three basic units. He then asked the

29	second questions- What is meant by derived units? A boy answered by saying that derived unit can be obtained by combining two or more fundamental unit or by multiplying or dividing.
30	
31	

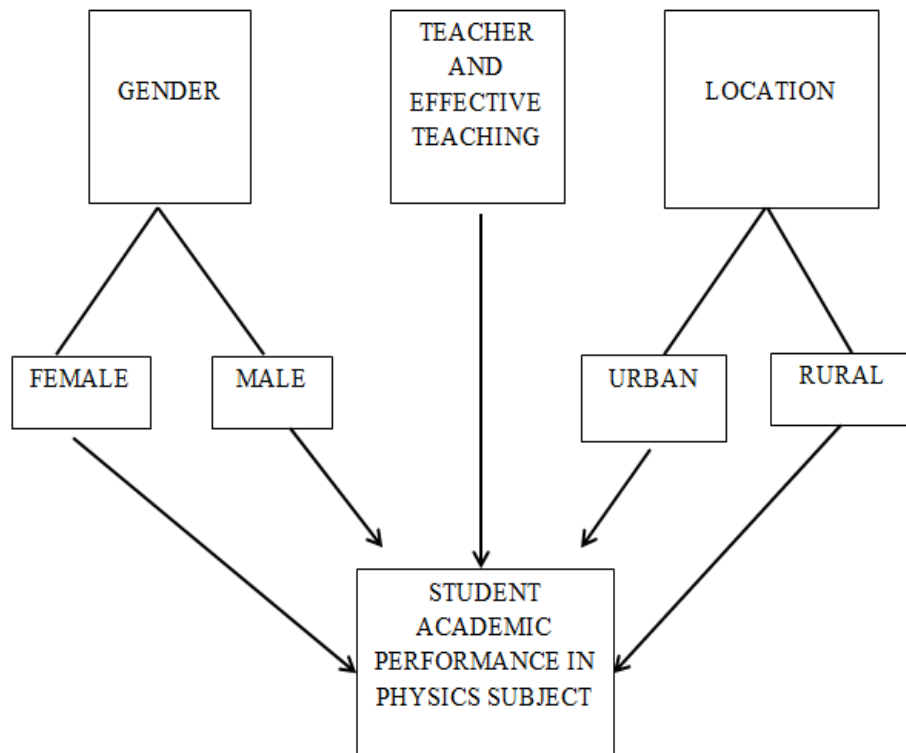
APPENDIX 17:

OBSERVATION OF MR. PATRICK: SEPTEMBER 2017 AT APONMU COMMUNITY HIGH SCHOOL IN THE CLASSROOM

LINE	DESCRIPTION
1	0-10minutes
2	The classroom was spacious and very neat except that the ceilings
3	are broken which made the class very hot in the afternoon. The
4	students concentrated well during the class activities. The teacher
5	started the lesson by writing the topic on the chalkboard. The topic of
6	the lesson was on speed, velocity and acceleration. The teacher
7	started by asking the students what speed is based on their previous
8	experience in physics. A female student answered the question that
9	speed is a distance moved in unit of time. A male student said that
10	speed is the rate of change of distance moved with time. The unit of
11	speed is m/s. Mr. Patrick's then asked the students to define velocity.
12	This was answered by a male student that velocity is the rate of
13	change of displacement with time. The teacher then asked the
14	students to differentiate between speed and velocity. A female
15	student answered the question. She said that speed is a scalar
16	quantity while velocity is a vector quantity. Also, the teacher told the
17	students to define acceleration. This was a well defined by another
18	female student as the rate of change of velocity with time. That
19	velocity is a vector quantity and the unit is m/s^2 . He then moved move
20	to the next subtopic- the equation of motion. Let the initial velocity be
21	u, acceleration be a, final velocity v, and time taken t.
22	11-40minutes
23	Mr. Patrick now gave the equation of acceleration as the change in
24	velocity over time taken i.e. $a=v-u/t$. then to get final velocity v, $v= u +$
25	at . The teacher demonstrated how the first law was obtained. He also
26	gave the students the second law of motion as $s = ut + \frac{1}{2} at^2$ and
27	explained its derivation. The third law as $v^2=u^2+2as$. He explained to
28	the students that the first law of motion connects all the parameters.

29	He mentioned that if the students are given questions to solve, they
30	must write out all they are given first. For example a bus travelling
31	with an initial velocity of 60km/hour accelerates uniformly at 5m/s ² .
32	Calculate the velocity after 2 minutes. The teacher first solved the
33	question on the chalkboard for the students using the first equation of
34	motion. That is, $v = u + at$. Another question was written on the
35	chalkboard. A body moving with an initial velocity of 13m/s
36	accelerated uniformly at the rate of 10m/s ² until it attained a velocity
37	of 15m/s. what is the distance covered during this period. A female
38	student attempted the question. The teacher guided the student to
39	first write the parameter first to make her work easier. The girl
40	eventually got the answer correctly. The teacher also gave another
41	two questions and one of the questions was solved by another female
42	students. The teacher however concluded the lesson by asking the
43	students the following questions based on the topic taught. A. what is
44	speed? B. What is velocity? C. What is acceleration?

APPENDIX 18:
DATA ANALYSIS SCHEME



APPENDIX 19

TURNITIN REPORT

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APPENDIX 20:

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EDITORIAL CERTIFICATE

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MANUSCRIPT TITLE

**EXPLORING HOW LOCATION AND GENDER INFLUENCE THE
PERFORMANCE OF STUDENTS IN PHYSICS**

Author:

OLUSEYE FOLASAYO SADARE

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